

June 10, 1969

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3,448,780

SAWMILL

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Sheet 1 of 2



FIG. 1

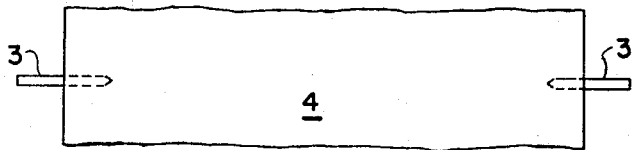


FIG. 2

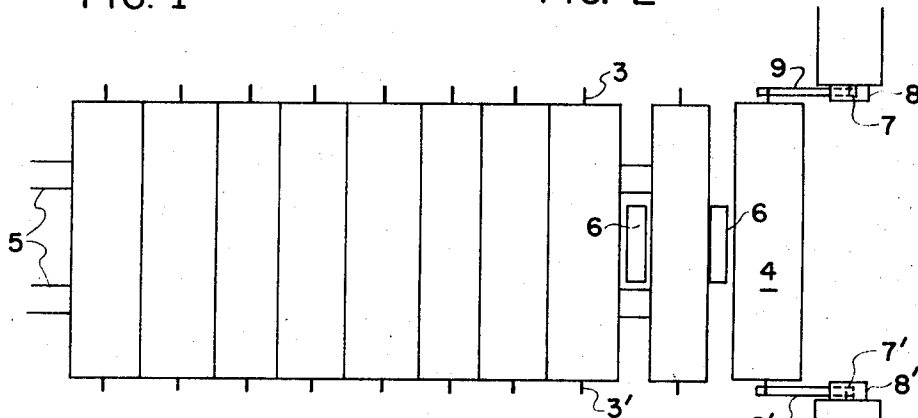


FIG. 3

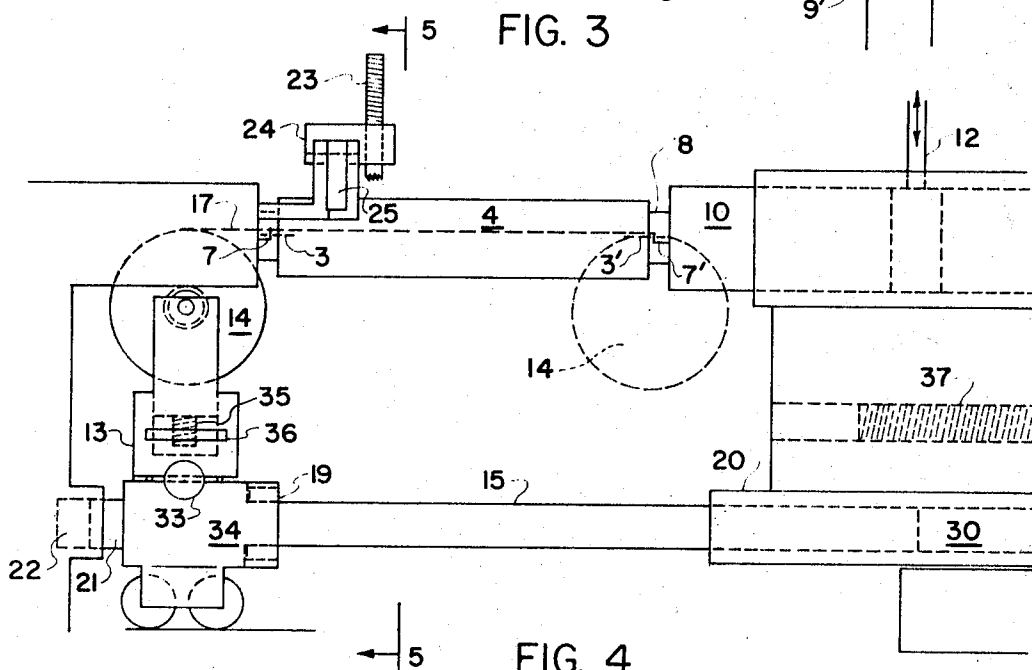


FIG. 4

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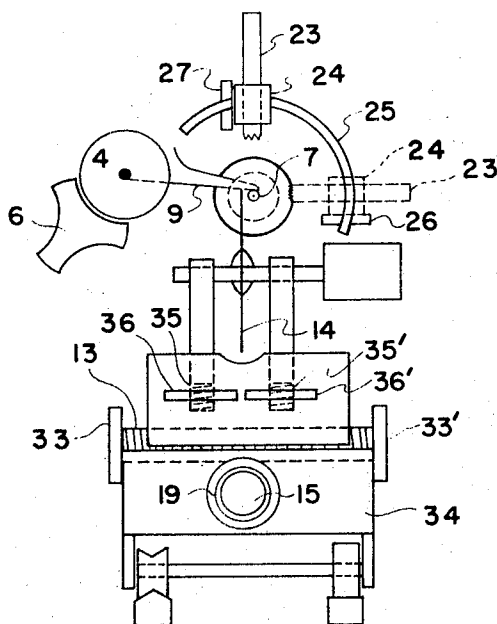


FIG. 5

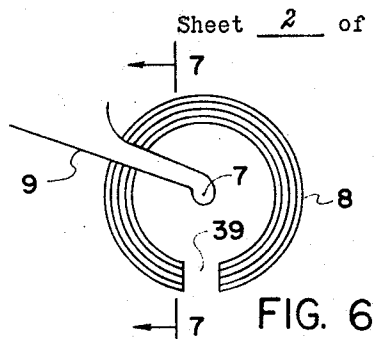


FIG. 6

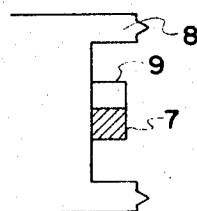


FIG. 7

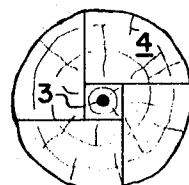


FIG. 8

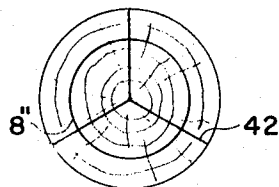


FIG. 9

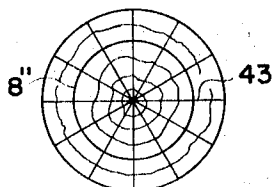


FIG. 10

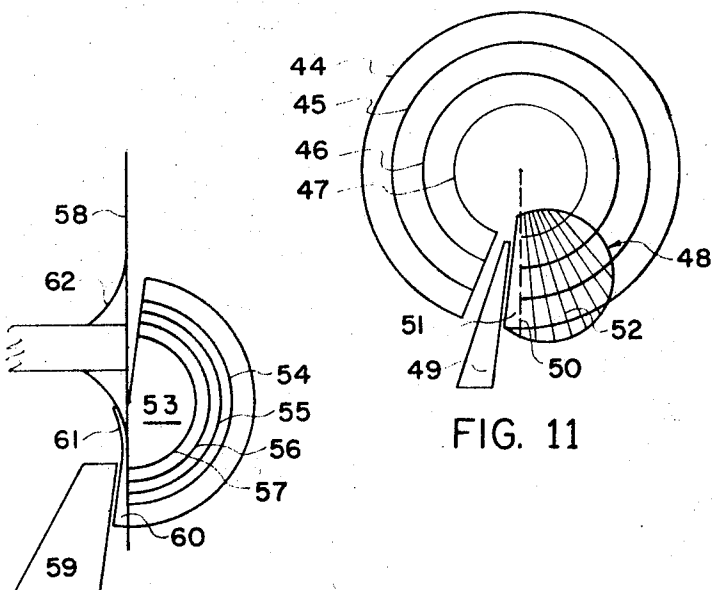


FIG. 11

FIG. 12

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U.S. Cl. 143—39

10 Claims

ABSTRACT OF THE DISCLOSURE

In abstract, a preferred embodiment of this invention is a sawmill which automatically feeds logs of a standard predetermined length into a sawing area and automatically reduces the logs as they pass through such area into lumber by cutting radially from a center portion of the log outwardly.

This invention relates to sawmills and more particularly to self-aligning, high speed, highly efficient, automatically operated sawmills.

In the past, sawmills have consisted basically of log carriages with adjustable knees which carry logs through a saw which cuts slabs and boards therefrom. The skill of the operator determines the accuracy and speed of the cutting as well as the yield and quality of the end product. Grade lumber cutting has depended upon the educated guess of the sawyer since the amount of defect within any log is not evident from the outside. Quite often highly defective log pith centers are sawn into boards of otherwise high grade thereby reducing both the grade and the value. Even though there are some semi-automatic sawmills known, still the cost of labor, human mistakes, delays and inaccuracies continue to cause great losses of potential profits inherent in lumber.

The present invention overcomes many of the defects of the known sawing mechanisms, systems and methods. It is fully automatic in reducing a log into flitches or lumber and certain applications may be fully automatic in engaging the log, reducing it to flitches or lumber, and disengaging all products onto a conveyor and then engaging the next log in a repeating process until such time as all logs on a log deck have been processed.

The saw of the present invention is arranged in such a manner that it saws from the inside out so that the saw blade is not influenced by the curved sides of the log nor damaged by foreign matter on the outside of the log. The log is held in place on an improved carriage which allows the log to automatically be turned after each pass of the saw. Due to applicant's novel arrangement, carbon teeth can be used on the saw with continual operation for several workdays without having to change blades. Additionally, due to the novel design, a thinner kerfed saw can be used thereby adding additional savings in several obvious ways.

The pith center of any log is of a highly defective or cull quality thereby degrading boards sawed therethrough. With the present invention, the pith center is automatically eliminated from high grade lumber and is salvaged for special use as structural material for which it possesses special qualities. Furthermore, the automatically sawn, heat free flitches produced on this improved mill may be re-sawn for exceptionally high grade products since the inside of the log is exposed, allowing its defects to be determined and taken into consideration prior to the determination of the kind of lumber to be produced.

It is therefore an object of the present invention to provide a sawmill which incorporates a fully automatic feed, cutting and removing system for sawn products and by-products.

Another object of the present invention is to provide a means for producing structural material from log cen-

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ters thereby eliminating degrading pith centers from the other products produced from the log.

A further object of the present invention is the provision of a novel means of holding a log being cut to allow the maximum yield to be obtained from said log.

Another object of the present invention is the provision of a means for reducing the danger of damage to, and excessive wear of, a sawmill saw blade by cutting from the inside of the log outwardly.

Another object of the present invention is to provide a means for maintaining constant pressure on the saw as it passes through the log even though relative hardness may vary from one portion of the log to another and from log to log, thereby preventing the blade from becoming crowded or running slack.

A further object of the present invention is to provide a sawmill wherein the saw travels through the log rather than the log travelling through the saw.

Another object of the present invention is to provide an automatic means for producing 100% edge grained bevelled lumber.

Other objects and advantages of the present invention will become apparent and obvious from a study of the following description and the accompanying drawings, which are merely illustrative of the present invention:

In the drawings:

FIG. 1 is an end view of a log to be cut;

FIG. 2 is a top view of such log;

FIG. 3 is a deck of logs to be cut including mill charging means;

FIG. 4 is a side elevation of such mill;

FIG. 5 is a cross section of the mill taken on lines 5—5 of FIG. 4;

FIG. 6 is a side elevational view of a log turning ring;

FIG. 7 is a cross section of such ring taken from lines 7—7 of FIG. 6;

FIG. 8 is a diagrammatic end view of a log disclosing a pattern of cut produced by the present invention;

FIG. 9 is a diagrammatic end view of a log disclosing another pattern of cut;

FIG. 10 is a diagrammatic end view of a log disclosing a further modification of cutting pattern;

FIG. 11 is a side elevational view of a modified turning ring; and

FIG. 12 is a modification of a cutting means of the present invention.

With further reference to the drawing, steel pins 3 and 3' are driven into either the pith centers or the geometrical centers of opposite ends of log 4. A series of such logs are then placed on a log deck 5 which terminates at one end with a log selector cog 6 which is adapted to place pins 3 and 3' into pin centering pockets 7 and 7' by way of approach ways 9 and 9'.

Once a log 4 has been moved into a position wherein pins 3 and 3' are resting in pockets or cups 7 and 7', an electrical contact (not shown) is made, which activates air intake 12 to move cylinder 10 in the direction of log 4 thereby causing turning rings 8 and 8' to rotatively engage said log, particularly as disclosed in FIG. 4.

An adequate amount of pressure is maintained on turning rings 8 and 8' to securely hold log 4 during the cutting process but not sufficiently tight to prevent such log from being rotated.

Once log 4 is in engaged position with turning rings 8 and 8', a means (not shown) is activated which causes motor driven saw 14 to pass through said log 4.

One means of moving said saw through said log is the incorporation of a hydraulic or air cylinder 30 which will pull carriage 34, upon which saw 14 is mounted, by way of piston 15. As carriage 34 approaches the end of cylinder 30, air is compressed in chamber 19 thereby giving a cushioning effect. Another automatic means (not

shown) reverses the flow of fluid within cylinder 30 to force piston 15 to move carriage 34 back to its starting position.

As carriage 34 approaches the starting position, piston 21 enters cylinder 22 thereby giving a cushioning effect.

As can readily be seen, great advantage is achieved by maintaining constant pressure on the carriage 34 which prevents the saw 14 from becoming crowded or running slack as occurs in manually operated sawing procedures.

Since the logs must be cut to close length tolerances before they enter the mill, two conventional sash trim saws (not shown) may be mounted on the log deck 5 to equalize such logs prior to the time the pins are inserted.

To originally align the saw bearing carriage 13 laterally on carriage 34, handle 33 is provided which activates screw 33', particularly as disclosed in FIG. 5.

Vertical and elevational adjustment may be made by the activation of handles 36 and 36' which in turn activate screws 35 and 35'.

The mill may be adjusted for a run of a different length of logs by activating screw 37 by means of a handle (not shown).

A motorized dog 23 is mounted on dog support 24 which is slideably mounted on turning arc 25. Limit switches 26 and 27 are provided which are adjustably mounted on turning arc 25.

In operation of a preferred embodiment of the present invention, a log 4 on log deck 5 engages cog 6 which moves pins 3 and 3' into engagement with slides 9 and 9'. Said slides carry said pins into engagement with cups 7 and 7' thereby activating means 10 for engaging turning rings 8 and 8' with the said log 4. Saw carriage 34 is then automatically activated, causing it to pass through log 4 in a longitudinal direction and automatically return to its original position. Next, motorized dog 23 is driven into the surface of log 4 by means of motorized dog support 24 which then moves on turning arc 25 thereby rotating log 4 until limit switch 26 is reached. Said switch 26 then activates motorized dog 23 to disengage the log which in turn activates dog support 24 to return to its original position adjacent limit switch 27. Upon reaching limit switch 27, the motorized dog once again engages log 4 and comes to rest in that position. The saw carriage 34 is again activated to move longitudinally through the log thereby recycling the process. This sequence is continued until a predetermined number of passes have been made by saw 14 through log 4. When the sequence has been accomplished, piston 10 automatically withdraws the engagement of turning rings 8 and 8' from the now sawn log 4 thereby allowing the sawn products to drop onto conveyor 29 which conveys such products away from the mill. At this point cog 6 is automatically activated to move another log into sawing position, and the cutting cycle is reaccomplished as above described. Upon the final log from log deck 5 being sawn and passed from the mill by conveyor 29, a conventional means (not shown) is activated to completely shut down the mill.

FIG. 6 is a side view of log turning ring 8 showing saw slot or opening 39. Pin slide 9 and pin centering cup 7 are also shown in their relative positions to ring 8.

An end view of log 4 is shown in FIG. 8 with 4 saw cuts 41 just before the sawn log is dropped from the machine to make way for the receipt of another log.

The disclosure of FIG. 9 shows the cutting of a log into three flitches for remanufacture into half round veneers. In this case cups 7 and 7' and ways 9 and 9' are removed from the machine and pins 3 and 3' are not inserted in the log. Saw 14 has been adjusted laterally, vertically, and elevationally as well as the travel of motorized dog 23 so that a log may be cut into three equal parts along lines 42.

Likewise in FIG. 10 the mill has been adjusting to cut the log along lines 43, thereby producing beveled boards which are 100% vertically grained. This type of product is considered ideal for house siding and the like.

In both FIGS. 9 and 10, a depression ring 8'' is scribed on each end of log 4 for engagement with rings 8 and 8' which hold the log in position for cutting.

A modification of the present invention is disclosed in FIG. 11 wherein multiple log turning rings 44, 45, 46 and 47 are substituted for single ring 8 at the ends of small log 48. Each of these four rings engages said small log in an off-center position. As log 48 is advanced, step by step, against log stop 49, each board is sawn along line 50 and removed after it has been cut into a beveled board 51. The projected saw cuts for the log are illustrated by lines 52. In this modification, beveled boards of exceptional width are cut from relatively small logs with a minimum of waste.

Another modified use of the slip ring holding means disclosed by the present invention is illustrated in FIG. 12 wherein slip rings 54, 55, 56 and 57 are provided on each end of a half log 53. A cutting means 58 such as a band saw or a circular veneer saw is mounted in such a position as to cut said log 53 as shown. An adjustable stop 59 may be provided to determine the level and thickness of the cut. If a circular veneer saw is provided (which is usually from $\frac{1}{32}$ to $\frac{1}{64}$ of an inch thick) it will require a saw stiffening flange 62 which is so shaped as not to interfere with the feather edge 61 of the beveled board 60 during the cutting operation.

It is obvious from the foregoing description that the present invention greatly increases the accuracy and quality of sawn products produced from logs at great savings in time and labor. Further, the various components of the overall invention facilitate the production of a variety of wood products which have not hereinbefore been practicable to produce. Additionally, applicant has produced such products automatically thereby further reducing the cost thereof.

Obviously the present invention may be carried out in other specific ways than those herein set forth without departing from its spirit and essential characteristics of invention. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

What is claimed is:

1. An automatic sawmill comprising a log storage means for a multiplicity of logs of a predetermined length; log transfer means for selectively transferring a log from said storage means to a cutting area; means for rotatively mounting said log within said area; means for alternately cutting and turning said log a predetermined number of times whereby said log is converted into a cut log; means for releasing said cut log from said mounting; and means for removing said cut log from said cutting area.

2. The sawmill of claim 1 wherein a means is provided for transferring another log from said storage means to said cutting area upon the release of said cut log whereby a continual, automatic sawmilling operation may be accomplished.

3. The sawmill of claim 2 wherein a means is provided to shut down said sawmill upon the cutting and removal of the last log transferred from the log storage means.

4. The sawmill of claim 1 wherein the means for rotatively mounting the log comprises at least one slip ring adapted to releasably engage each end of said log whereby rotation of said log may be accomplished while the fixed relative position of the portions of the log being cut is maintained.

5. The sawmill of claim 1 wherein the cutting means comprises an adjustable blade which is adapted to saw the log longitudinally at a depth equal to less than the diameter of said log whereby cutting may be accomplished from the inside of the log outwardly.

6. The sawmill of claim 5 wherein the blade is mounted

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on a carriage which is adapted to move in a path parallel to the longitudinal axis of the log being cut.

7. The sawmill of claim 1 wherein the turning means comprises a motorized dog movably mounted on an arc-shaped track; said track being positioned generally parallel to the exterior of the log; and limit switches adjustably mounted on said track whereby the rotation of the log may be controlled thereby controlling the sawed product produced.

8. The sawmill of claim 1 wherein the means for removing the cut log from the cutting area is a conveyor belt.

9. The sawmill of claim 1 wherein the means for releasing said cut log is an air cylinder.

10. The sawmill of claim 1 wherein the means for releasing said cut log is a hydraulic cylinder.

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143—47, 92, 108, 125