A sawmill including a multiple number of rotating circular sawblades wherein the guides maintaining the sawblades in their proper position and the spreaders adjacent the exit side of the sawblades are mounted by means which are easily adjustable and allow for easy removal and insertion of the guides and spreaders. The guides and spreaders are each mounted on two horizontally disposed, threaded bars having appropriately positioned and spaced nuts thereon. The mounting portion of the guides and spreaders include two slots, a curved one in the bottom edge and a straight one in the end edge on the end away from the sawblades, the slots mating with the horizontally disposed rods when the guides and spreaders are mounted thereon. Positioning nuts are included on the threaded rods for locking the guides and spreaders onto the rods and for allowing easy and precise lateral and angular adjustments thereof. Restraining rings are included about the terminal portions of the curved slots in the spreaders which cooperate with the nuts to further lock the spreaders onto the rods.

10 Claims, 8 Drawing Figures
SAWMILL WITH ADJUSTABLE GUIDES AND SPREADERS

BACKGROUND OF THE INVENTION

The present invention relates to a sawmill having usually a multitude of sawblades having guides and spreaders placed at the entrance and exit portions of the sawblades, and is particularly directed to the mounting system used for the guides and spreaders in the sawmill.

In the country today there has been a steadily increasing demand for lumber for use, for example, in the home building industry. Indeed the annual world production of sawed wood (i.e. lumber) is estimated to be about 140,000,000,000 bd. ft.

In years past, the lumber mill industry included a large number of relatively small, independent operators. However there has been a trend over the last few decades wherein the industry has become dominated by relatively large, high volume processors, causing many of the small, independent operators to go out of business. The demise of the small independent operator has been primarily caused by the fact that they were unable to effectively compete economically with the large processors due to the various limitations of the machinery with which the small independent operators had to operate.

In particular, the sawmill machines which the small independent operators had to use in the past were subject to many problems including breakdown, maintenance, relatively slow throughput speed and accordingly limited production, and lack of good reliability and safety. Heretofore, the machines that have been developed in the industry to overcome these various problems have been machines which have been very complex, sophisticated and very expensive machinery, affordable only by the very large, national processors.

However, with the present invention, a sawmill machine which overcomes the above prior art problems, is possible at a price level easily affordable by the small, independent operator. Although the structural system utilized in the present invention is relatively simple and straightforward in retrospect, it is believed that the resulting sawmill machine represents a substantial breakthrough in this field.

The sawmill machine of the present invention includes a multiple number of sawblades which are positioned by guides and spreaders placed at the entrance side of the sawblades and a series of spreaders positioned at the exit side of the sawblades for splitting the log sections apart after being cut by the blades, the guides and spreaders being mounted in such a manner that they can be easily but precisely adjusted, and readily removed and replaced if desired.

Some of the advantages of the sawmill machine of the present invention is that the operative elements, namely the guides and spreaders, used in association with the sawblades are adjustable by means of a system which is simple, quick, precise and versatile, and moreover this system is highly adaptable and is easy to set-up on any multiple, or for that matter, single blade sawmill. The case and precision of adjustment of the elements of the present invention promote safety and particularly help to prevent "kickback" of the logs during use of the sawmill. Likewise the maintenance problems associated with the sawmill are greatly reduced because the guides and spreaders can be completely removed just by loosening, for example, two nuts a slight amount and replaced in the same manner utilizing readily available, standard tools.

BRIEF DESCRIPTION OF THE DRAWINGS

For a further understanding of the nature and objects of the present invention, reference should be had to the following detailed description, taken in conjunction with the accompanying drawings, in which like parts are given like reference numerals and wherein:

FIG. 1 is a perspective view of the overall sawblade portion of the sawmill machine of the present invention.

FIG. 2 is a top view of the guide section of the sawmill machine of the present invention.

FIG. 3 is a side, cross-sectional view of a portion of the guide section, taken along section lines 3—3 of FIG. 2.

FIG. 4 is an exploded, perspective view of a portion of the guide section, showing the structure of a single guide element.

FIG. 5 is a side view of a single spreader element used in the spreader section of the sawmill machine of the present invention.

FIG. 6 is an end, cross-sectional view of a portion of the spreader element of FIG. 5, taken along section line 6—6 of FIG. 5.

FIG. 7 is a top view of the spreader section; while FIG. 8 is a side, cross-sectional view of the mounting rods used in a spreader section, taken along section lines 8—8 of FIG. 7.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred embodiment of the present invention will be described with reference to a sawmill having a number of rotating sawblades mounted on a common, central shaft, a type of sawmill to which the present invention is particularly applicable. However, it should be understood that the basic principles of the present invention could be applied to other types of sawmills, for example those utilizing bandsaws or for example sawmills having only a single blade.

As shown in FIG. 1, the sawmill machine of the present invention includes a log cutting section 1 wherein there are a multitude (four being illustrated) of circular sawblades 2 mounted on a common, central shaft 3, the latter of which is rotatably mounted on a basic frame 4. The frame 4 carries an endless conveyor bull chain 5 which carries logs to be cut into and through the cutting section, producing basic lumber sections which are then further processed.

The cutting section 1 of the sawmill also includes a guide section 20 and a spreader section 30 positioned adjacent to the circular sawblades 2, the former at the entrance side of the blades and the latter at the exit side. The guide section 20 and spreader section 30 are mounted on the frame 4 by means of cross-bar frame members 10, 11, respectively.

The conveyor chain 5 is driven by standard drive means 6, while the circular saw blades 2 are driven by drive means 7 through V belt elements 8. A pair of rollers 9 are included to centrally position the log on the conveyor chain as it approaches the sawblades 2.

As illustrated particularly in FIGS. 2-4, the guide section 20 of the cutting section 1 of the sawmill of the
preferred embodiment of the present invention includes a series of guides 21, 21', each one of which mates with an individual one of the circular sawblades 2. Each guide element 21, 21' is mounted in the sawmill machine on two horizontally disposed, threaded rods 22, 22'. The parallel rods 22, 22' are mounted on the basic frame 4 by means of support elements 23', 23''.

The guide elements 21, 21' each comprise two extension arms 23, 24 and 23', 24', respectively, which form a guide or positioning yoke about each sawblade 2. The guide elements 21, 21' bear against and position the sawblades 2 by means of dowel inserts 26, 260 which for example can be made of wood.

The auxiliary arm element 24 is fastened to the main arm element 23 by means of two bolts 27 placed in a line perpendicular to the direction of extension of the arms. The position of the auxiliary arm 24 is variable with respect to the main arm element 23 by means of adjusting set-screw 28. As set-screw 28 is screwed in and out, the auxiliary arm element 24 rotates about a fixed point 29, thereby moving with respect to element 23. The guide elements 21' are likewise structured and are adjustable in like manner.

The position of the guide elements 21, 21' can be laterally adjusted with respect to the frame 4 by means of equally moving the positioning nuts 25 on both rods 22, 22', and angularly adjusted by means of moving the positioning nuts 25 on only one rod or unequally moving them on both.

The main arm member 23 has at its end side and its bottom side mounting slots 24, 24', respectively, which cooperate and mate with the mounting rods 22, 22' respectively. Slot 24 is straight and is included at the end side away from the sawblade 2, that is at the end opposite its operative end, while slot 24' is curved. The cooperative relationship between the slots 24, 24' and the rods 22, 22' allow the guide elements 21 to be easily removed and/or mounted in the sawmill machine. For example, to remove the guide element 21 from the mounting rods 22, 22', the guide element is merely moved upward at its operative end and rotated about the rod 22 (note arrow in FIG. 8) after the positioning nuts 25 have been loosened. After the rod 22' clears the slot 24', the guide element 21 can then be pulled straight out and up away from the rod 22, thereby being completely free. In like but opposite fashion, the guide element 21 can be mounted in the sawmill machine.

The mounting system for the spreader elements 31 and the spreader section 30 is structurally similar in principle to that for the guide elements 21 in the guide section 20.

As illustrated in FIGS. 5–8, the spreader section 30 includes a series of spreader elements 31 mounted on two horizontally disposed, parallel rods 32, 32'. Each spreader element 31 includes a pointed edge section 33 for splitting apart the cut log sections, as well known in the art. The spreader element 31 has a slot 34 at its end edge and a curved slot 34' at its bottom edge (note particularly FIG. 5).

In similar fashion to that discussed above with respect to the guide elements 21, 21', the spreader elements 31 are easily mounted and removed, and also easily positioned laterally and angularly by means of nuts 35. It is noted that the rods 32, 32' are mounted on the frame 4 by means of vertical supports 36.

The spreader elements 31 further include on at least one side surface thereof, restraining ring sections 31', 31', which can be for example standard washer sections welded about the terminal portions of the slots 34, 34', respectively, and to the main body of the spreader elements 31. The restraining ring sections 31', 31' serve to lock the spreader elements 31 on the mounting rods 32, 32' in conjunction with the nuts 35 that mate with and fit within the restraining ring sections 31', 31'. It is noted that the inner diameter of the ring sections 31', 31' are just a little bit larger than the outer diameter of the nuts 35, and the length of the minor, missing section of the ring, that is the gap distance, is less than the outer diameter of the nuts 35. Once a nut 35 is tightened into the terminal portion of the slots 34, 34' on the side on which the restraining rings 31', 31' are mounted, no rotation or movement of the spreader element 31 is possible because the restraining rings 31', 31', bear against the edge surfaces of the mating nuts 35.

Such a locking system is necessary on the spreader elements 31 because the natural tendency of the cut log sections is to push the spreaders up and about the mounting rods 32, 32', which in the absence of a locking system could cause the spreader elements 31 to be removed from their mounts. Of course such a similar locking system could be applied to the guide elements 21, but such has not been found necessary in use since the natural tendency of the logs moving by the guide elements 21 tends to force them into their mounts.

An exemplary alternative locking system would be to put an aligned set of holes through the guides 21, 21' and/or the spreaders 21, and the mounting brackets for the rods, and, when locking is desired, placing another rod through the aligned holes, preventing any relative movement of the operative elements with respect to the mounting rods.

The present invention thus provides a sawmill machine having guides and spreaders which are easily removable and replaceable and which have maximum flexibility and adjustment, but also precision, in their position and alignment. The threaded rods 22, 22' and 32, 32' along with the nuts 25 and 35 allow the guides and spreaders to be set up in any position along the lateral dimension of the machine and indeed allows minute adjustments thereof. This is valuable in any sawmill machine and particularly one in which the sawblades themselves are laterally adjustable in position to produce different thicknesses of cut log sections.

Because many varying and different embodiments may be made within the scope of the inventive concept herein taught, and because many modifications may be made in the embodiment herein detailed in accordance with the descriptive requirements of the law, it is to be understood that the details herein are to be interpreted as illustrative and not in a limiting sense.

What is claimed is: 1. A sawmill machine comprising a cutting section including at least one movable sawblade therein and conveying means associated with said sawblade for conveying a log into, through and past said cutting section; said cutting section further including at least one operative element section positioned at the side of the sawblade, each said operative element section having at least one operative element therein associated with said sawblade, each said operative element having two slots therein, a first slot at its distal, non-operative end
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5 and a second slot at its bottom edge; each said operative element section further including a mounting system, said mounting system comprising two parallel, horizontally disposed rods and fastening means for fastening said operative element to said rods, the operative element being mounted on said mounting system with said slots mating with said rods.

2. The sawmill machine of claim 1 wherein there is included two operative sections, a guide section and a spreader section, the guide section being positioned at the entrance side of said sawblade and the spreader section being positioned at the exit side of said sawblade, said operative elements being guide elements and spreader elements, respectively.

3. The sawmill machine of claim 1 wherein said first slot is straight and said second slot is curved, the curved slot defining a circular segment having a radius equal to the distance separating said two rods, said operative elements being removed by rotating them about the rod in said straight slot until the other rod is cleared out of said curved slot, the operative elements then being pulled out; and said operative elements are mounted in opposite fashion.

4. The sawmill machine of claim 1 wherein said rods are threaded and said fastening means comprise sets of nuts which are screwed on said threaded rods.

5. The sawmill machine of claim 1 wherein said operative element is a guide element and said guide element comprises two extension arms forming a yoke, a first main extension arm and a second auxiliary extension arm, said auxiliary extension arm being mounted on said main extension arm by mechanical means fixing the two together along a line perpendicular to the direction of extension of the arms, and wherein there is further included set-screw means positioned between said two extension arms and located on one side of said line, and further including rotatable surface means located on the other side of said line and positioned between said arms; whereby the width of the yoke can be varied by means of rotating said set-screw causing the auxiliary arm to be moved with respect to said main arm about said rotatable section means.

6. The sawmill machine of claim 1 wherein said operative element is a spreader element and said spreader element includes restraining means positioned at and about the terminal portions of said slots, said mounting system further including locking means mounted on said rods for positioning within said restraining means; whereby said spreader element normally cannot be moved with respect to said mounting system because of the restraining means bearing against said fastening means; said restraining means comprising a major section of a ring and said fastening means being standard nuts, the inner diameter of said ring being just a little bit larger than the outer diameter of said nut and the length of the missing, minor section of said ring being less than the outer diameter of said nut.

7. The sawmill machine of claim 1 wherein there is included a multiple number of sawblades and a corresponding number of operative elements in each operative section.