United States Patent [19]

Walker

[11] **3,920,058**

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[54] **METHOD OF SAWING LOGS**

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 117,442, Feb. 22, 1971, Pat. No. 3,738,404.

[52] **U.S. Cl.** ..... **144/312;** 144/3 R; 144/39; 144/114 R; 144/242 R; 144/326 R

[51] **Int. Cl.²** **B27B 1/00**

[58] **Field of Search** ..... 144/312, 136 R, 114 R, 144/39, 326 R, 326 A, 41, 242 R, 162, 3 R; 83/837

[56] **References Cited**

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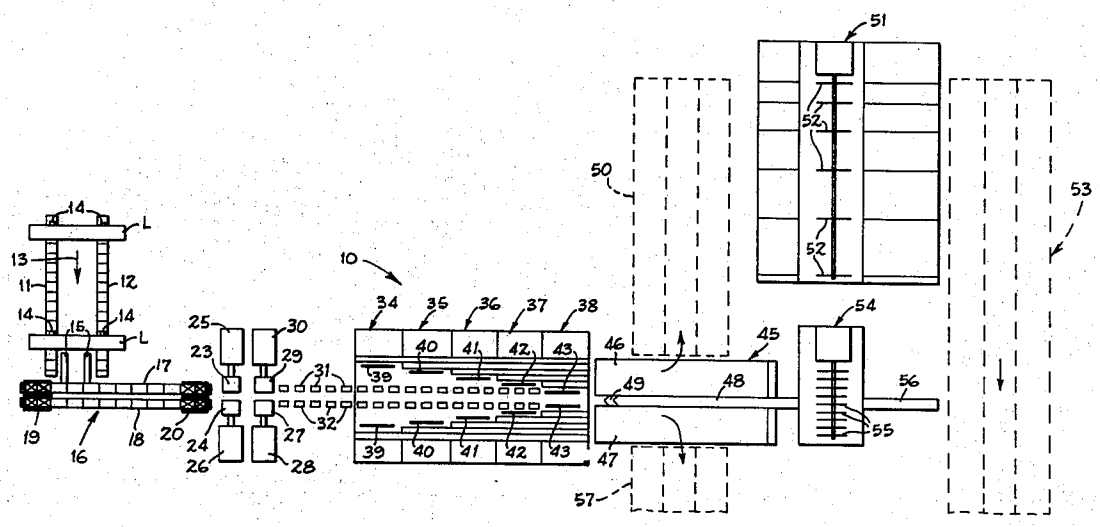
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[57] **ABSTRACT**

Small logs of various diameter sizes are conveyed along a linear path of travel while two notches are chipped in the bottom of the log's periphery. The log surfaces formed by the notches are planed to provide bearing surfaces for guiding the log. As the log continues along the linear path, it is sawed by planar saws into slabs having thicknesses corresponding to finished lumber strips or boards and dimensional lumber. The slabs are then sawed with planar edger saws to form finished strips, boards or dimensional lumber.

8 Claims, 5 Drawing Figures



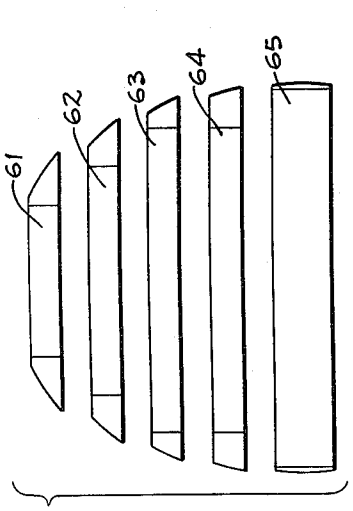


FIG. 4

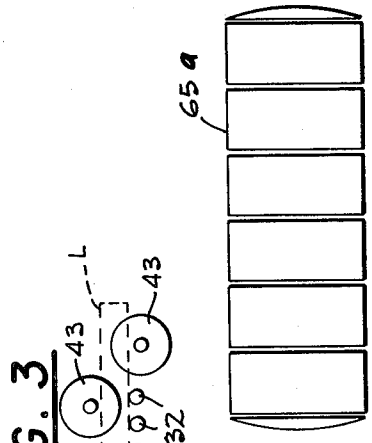


FIG. 5

FIG. 3

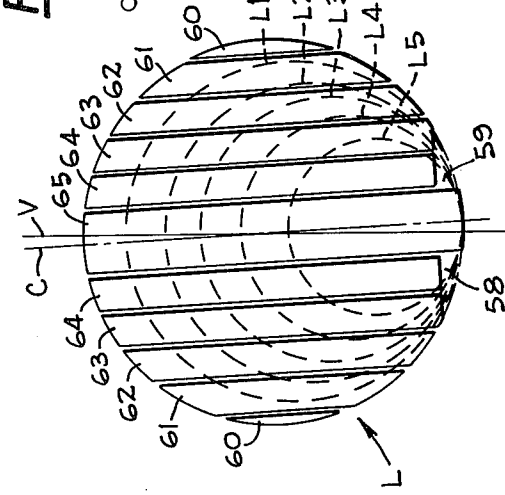


FIG. 2

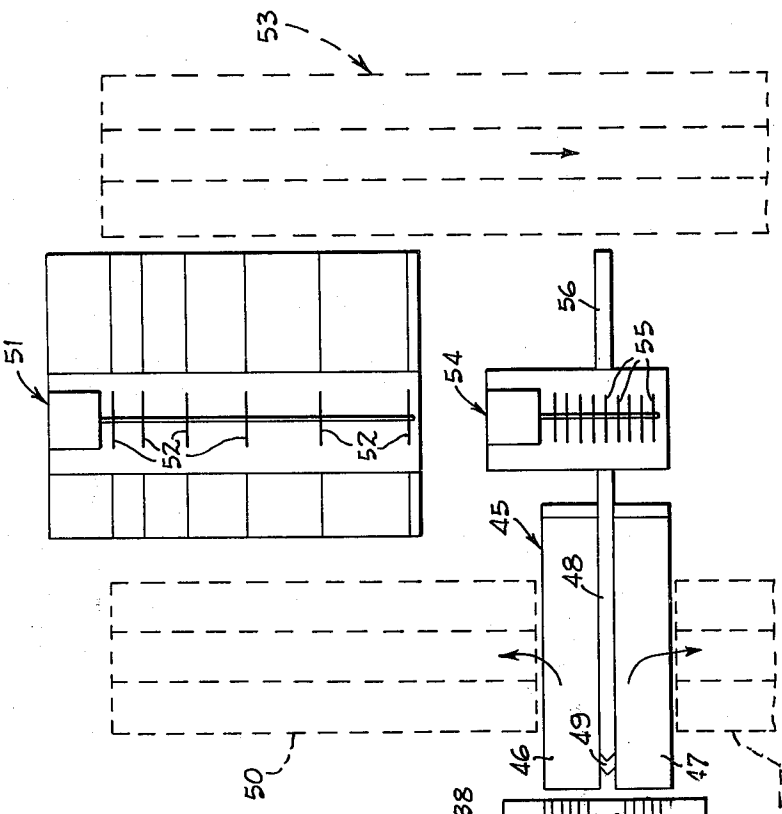


FIG. 1

METHOD OF SAWING LOGS

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of my co-pending application Ser. No. 117,442, filed Feb. 22, 1971 and which will issue as U.S. Pat. No. 3,738,404 on June 12, 1973.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a method of sawing logs, which may vary in diameter size, to produce a maximum amount of finished lumber with a minimum amount of handling.

2. Description of the Prior Art

Customary sawmill practice provides for sawing logs into rough lumber and then running the rough lumber through a planer mill where the surfaces are finished. When cutting rough lumber, an extra one-eighth of an inch is allowed on each side for removal by the planar. In addition to the loss of wood in the planing operation, there is extra handling in gathering up the rough lumber, transporting it to the planer and running the rough lumber through the planer.

Logs of relatively small diameter present a problem as it normally is not economically feasible to use small timber. Special sawmills have been developed for handling small logs to reduce the manual labor requirements and thereby improve the economic feasibility of sawing small logs into lumber. Such a mill is disclosed in U.S. Pat. No. 3,304,971. With changes in the diameter size of the logs, different ways of chipping and sawing the log are necessary to get the maximum amount of lumber out of the log. Furthermore, the lumber is rough cut and has to be sent to a planer for finishing.

Another method of producing lumber from small diameter logs is disclosed in U.S. Pat. No. 3,313,329. Notches are chipped in the bottom periphery of the log and the surfaces of the notches act as bearing surfaces to guide the log along a linear path through chipping and sawing operations. The lumber is rough cut and has to be sent to a planer for finishing.

An additional small log sawmill is shown in U.S. Pat. No. 3,254,157. None of the above mentioned patents provide for handling logs of various diameters in a uniform manner. Thus, the logs must be segregated according to size and only logs of a given diameter processed at one time or else the manner of processing must vary with the diameter of each log. Furthermore, all of the above patents are limited to producing rough lumber which must be sent to a planer for further processing.

SUMMARY OF THE INVENTION

An advantage of the present invention is that small logs, which vary in diameter from about 5 inches to 14 inches, can be sawed in a uniform manner to produce finished lumber. Another advantage is that since planer saws are used to cut the logs into a series of slabs having thicknesses corresponding to finished lumber strips or boards, no further planing is required and one-eigth of an inch of wood on each side of the slabs is saved. These advantages tend to make the harvesting of small diameter logs economically feasible when otherwise such timber would be wasted.

Small logs of various diameter sizes are conveyed along a linear path of travel while two notches are chipped in the bottom of the log's periphery. The log surfaces formed at the notches are planed to provide bearing surfaces for guiding the log accurately as it is sawed by planer saws into slabs having thicknesses corresponding to finished lumber strips or boards and dimensional lumber. All logs, regardless of diameter size, are sawed into slabs on the same planes relative to the centerline of the log so the interior slabs have uniform thicknesses for each log but vary in width and number of slab sections in accordance with the diameter of each log sawed. The slabs are then directed to appropriate planer edger saws to remove excess wood at the edges and form the widest finished strips, boards or dimensional lumber that can be cut therefrom.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a diagrammatic plan view of a sawmill for converting small logs of various diameter sizes into finished lumber.

FIG. 2 is a schemmatic view representing the ends of various diameter sizes of logs having notches chipped from the bottom periphery and sawed uniformly into slabs.

FIG. 3 is a side elevation view illustrating oversaws and undersaws in a saw assembly.

FIG. 4 is a series of end views illustrating how the slabs shown in FIG. 2 are trimmed by the edger saws to form strips, boards and dimensional lumber.

FIG. 5 is an end view of the center slab illustrating how it can be cut by the gang saw into dimensional lumber.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to FIG. 1, logs L are fed to a sawmill **10** by a pair of parallel spaced endless roller chains **11** and **12** traveling in the direction of arrow **13.** The logs extend transversely between the roller chains and are contacted by pusher dogs **14** spaced at uniform intervals along the chains. A ramp **15** is provided at the discharge end of the roller chains to support logs being transferred to a conveyor **16** aligned perpendicular thereto. Conveyor **16** is formed by two endless roller chains **17** and **18,** preferably multiple strand type such as five strand. Roller chain **18** is trained about sprocket wheels **19** and **20,** and roller chain **17** is similarly trained about sprocket wheels. The upper reaches of the roller chains are transversely inclined as to form a trough for receiving logs. Logs discharged from the roller chains **11** and **12** are centered by gravity within the trough formed by roller chains **17** and **18** and are conveyed longitudinally along the trough.

Downstream from conveyor **16** are a pair of bottom notch chippers **23** and **24** driven by motors **25** and **26,** respectively. It will be understood that suitable hold down rollers should be provided to prevent logs from moving upward while being chipped, but these have been omitted to simplify the drawing. Also, chip ducts can be provided downstream from each chipper to collect and carry away chips produced. The bottom notch chippers cut two notches from the bottom surface of a log on opposite sides of the logs centerline. The surfaces of the log adjacent the notches are finished by a planer **27** driven by a motor **28** and a planer **29** driven by a motor **30.**

Guide rollers 31 and 32 are provided to support logs moving through the sawmill downstream from planers 27 and 29. The rollers can be inclined slightly to the horizontal so that guide roller 31 maintains the log in lateral alignment by contact with the corresponding notch, while both guide rollers provide vertical support for the moving log.

Saw assemblies 34, 35, 36, 37 and 38 are arranged in a line so that assembly 35 receives directly the output of assembly 34 and each subsequent assembly receives directly the output of the immediately preceeding assembly. In the assembly 34 are at least two spaced apart saws 39 and in saw assembly 35 there are at least two spaced apart saws 40. Likewise, saw assembly 36 has spaced apart saws 41, saw assembly 37 has spaced apart saws 42 and saw assembly 38 has spaced apart saws 43. The saws are schemmaticly illustrated in FIG. 1 and it will be seen that the saws 39 are spaced further apart from each other than saws 40 which in turn are spaced further apart than saws 41. In like manner, saws 42 are spaced closer together than saws 41 and saws 43 are spaced closer together than saws 42. These saws are planer saws of a type available in usual commercial channels and each saw represented schemmatically in FIG. 1 includes an over saw and an under saw as shown in FIG. 3. Thus, the oversaw cuts downwardly through the upper half of the log and the undersaws cut upward through the entire log and have a thickness larger than the oversaws to produce a smooth cut.

Saw assembly 38 is connected to a side lumber and center slab conveyor 45 having a left transfer apparatus 46, a right transfer apparatus 47 and a center slab conveyor 48. A kick-off gate 49 is positioned at the front of the center slab conveyer to push slabs of lumber from the left transfer apparatus and the right transfer apparatus. It can also be used to divert the center slab to either the left or right transfer apparatus or allow the center slab to continue along conveyor 48.

Slabs diverted from the left transfer apparatus 46 are carried by a left conveyor 50 to positions opposite an edger saw assembly 51. A series of planer edger saws are arranged at spaced intervals corresponding to widths of finished strips or boards. The slabs are then fed through the appropriate edger saws 52 to obtain the widest possible finished strip or board from the particular slab. The finished strips or boards then pass through the edger saw assembly onto transfer chains 53 which carry the lumber in the direction of the arrow to a stacker, not shown.

Center slabs allowed to continue along conveyor 48 are turned on their side and passed through a gang saw assembly 54 having a multiplicity of planer saw blades 55 for cutting the center slabs into finished dimensional lumber. A conveyor 56 directs the output from the gang saw assembly to transfer chains 53 which carry the finished lumber to a stacker. Right conveyor 57 is positioned opposite the right transfer apparatus 47 to carry slabs diverted therefrom to an edger saw assembly, not shown, which is similar to the edger saw assembly 51 for left conveyor 50.

With reference to FIG. 2, notches 58 and 59 are chipped in the bottom periphery of all logs regardless of diameter size. It will be noted that the centerline diametrical plane C of the log is tilted slightly from the vertical axis plane through the centerline of the log so that the log will be supported laterally by the surface of notch 58 that bears against roller 31. Since the sides of the log at the notches are planed, rollers 31 and 32 which fit within notches 58 and 59 can maintain the log in proper alignment as it travels through saw assemblies 34–38. Logs L having a diameter as indicated in solid line are trimmed by saws 39 as to remove slabs 60 therefrom. Similarly, saws 40 cut slabs 61, saws 41 cut slabs 62, saws 42 cut slabs 63, saws 43 cut slabs 64 and the center slab 65 passes through saws 43. For logs of a somewhat smaller diameter, as indicated by phantom line L1, only slabs 61–65 are cut therefrom. Various other diameter sizes are represented by the sections shown in phanton line and given reference numerals L2, L3, L4, and L5. Thus, it will be seen that the logs, regardless of diameter size, are cut on common planes to produce slabs that vary in width. The outermost slabs having an arcuate surface such as slabs 60 are discarded while slabs having two flat surfaces are directed to the edger saw assembly 51 for further trimming, as indicated in FIG. 4. The rectangular interior portion represents the size of finished strips, boards or dimensional lumber that can be cut from slabs 61, 62, 63, 64 and 65. The thickness of slabs 61–64 corresponds to a finished one-inch strip or board having a dimension of thirteen-sixteenths of an inch. Center slab 65 has a thickness corresponding to a 2 inch piece of dimensional lumber having an actual size of one and five-eighths inches.

If the logs being processed are predominately of the larger diameter sizes, saw assembly 43 can be removed so that center slab 65*a*, shown in FIG. 5 would have a thickness that corresponds to slab 65 and two slabs 64 or a thickness of three and five-eighths inches. Such a slab is allowed to continue along center slab conveyor 48 and then turned on it's side and passed through gang saw assembly 54 where it is cut by the planer saws 55 into two by fours as indicated in FIG. 5.

Although the best mode contemplated for carrying out the present invention has been herein shown and described, it will be apparent that modification and variation can be made without departing from what is regarded to be the subject matter of the invention.

I claim:

1. A method of sawing small logs of various diameter sizes into finished lumber comprising the steps of conveying each log along a linear path of travel, chipping two notches in the bottom of the log's periphery to form two support surfaces thereon extending in the same substantially horizontal plane and two surfaces perpendicular to the support surfaces, planing the log surfaces formed by the two notches, employing the planed surfaces of the log at the notches as bearing surfaces to guide the log along the linear path of travel through the first subsequent sawing operation, sawing the log with planer saws on planes perpendicular to the substantially horizontal plane of the support surfaces to divide the log into a series of slabs with those slabs removed inwardly from the outermost slabs having thicknesses corresponding to finished lumber strips and the center slab having a thickness from which finished dimensional lumber can be cut, sawing the slabs with planer edger saws to form finished strips or boards, and sawing the center slab of the log with planer saws to form finished dimensional lumber.

2. The method set forth in claim 1, wherein said log is sawed with planer saws on planes perpendicular to the substantially horizontal plane of the support surfaces by removing pairs of slabs from opposite sides of the log and successively repeating the sawing operation as the log continues to move along the linear path of

travel so that a succeeding sawing operation receives the central portion of the log passing through the immediately preceding sawing operation.

3. The method set forth in claim 1, wherein each log, regardless of diameter size, is sawed on the same planes perpendicular to the substantially horizontal plane of the support surfaces so that the interior slabs and center slab have uniform thicknesses but vary in width and number of slab sections in accordance with the diameter of the log sawed, and further including the step of manually directing the slabs to the appropriate planer edger saws for cutting the widest standard finished strip or board therefrom.

4. The method set forth in claim 1, wherein the center slab of the log has a thickness corresponding to the finished width of dimensional lumber, and further including the step of turning the center slab on its side before sawing with a gang of planer saws to form small dimensional lumber.

5. The method set forth in claim 1, wherein the center slab of the log has a thickness corresponding to the finished thickness of dimensional lumber, and further including the step of manually directing the center slab to the appropriate planer edger saws for cutting the widest standard finished strip or board therefrom.

6. The method set forth in claim 1, wherein the center slab is cut from the log on planes perpendicular to the substantially horizontal plane of the support surfaces and coplaner with the two perpendicular surfaces at the notches.

7. The method set forth in claim 1, wherein the log is sawed on planes perpendicular to the substantially horizontal plane of the support surfaces by a first set of planer saws positioned over the log and cutting downwardly therein and then by a second set of planer saws positioned under the log and cutting upwardly therein to coincide with the downward saw cuts.

8. A method of sawing small logs into finished lumber comprising the steps of forming from each log at least one slab having two parallel finished surfaces with a thickness between the finished surfaces corresponding to a thickness size of finished lumber, and sawing the slab longitudinally on planes perpendicular to the finished surfaces with a pair of parallel planer edger saws spaced a distance apart corresponding to the largest width size of finished lumber that can be cut from the slab.

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