This invention relates to a random length end printer for lumber whereby a grade mark, firm name and/or trademark is impressed into the end grain of boards to identify origin and/or the quality of the lumber. It is a principal object of the invention to provide a printer which will mark boards of random length and/or width and/or thickness on either one or on both ends with precision and clarity so as to yield boards of high merchantable quality and by means of a mechanism which is of sufficient speed to make practical the use of the printer in a modern high production lumber mill.

With the expiration of the basic hard board patents and the consequent rapid expansion of facilities for manufacturing and marketing the same, with the snowballing development of the plastic and lightweight metal substituents in the building trades, and with the increasing cost differentials between domestic and offshore lumber, the lumber industry in Canada and the United States is becoming increasingly competitive. This competition has bred an increased awareness in the industry of the relationship of cost of production and quality of lumber product to the sales volume thereof. One facet of this awareness is reflected in the revolution now in progress in the method of marketing lumber. Thus, lumber heretofore has been considered to be and has been marketed by many as if it were a fungible goods. A two-by-four of fixed grade, finish and species was considered to be the structural and the marketable equivalent of every other two-by-four of like grade, finish and species. This consideration and these thoughts no longer are held by either the progressive members of the lumber and building trades or the general consuming public and the change in this thinking truly is revolutionary. It is this revolution and the consequent efforts of the industry to school or, by advertising, to educate the public and thus to increase the market for lumber that have led to the development of the instant invention.

Increasing numbers of lumber manufacturers are marketing their finished grades and even some rough grades with one or with ends bearing a firm name and/or a trademark. The obvious purpose of thus marking and marketing the lumber is to create a customer assurance of quality, integrity, and prestige and to carry to the point of ultimate purchase and consumption the mark or name of the manufacturer. Additionally, manufacturers selling marked lumber now are tying the firm name or trademark in with local, regional, or national advertising campaigns directed toward the marketing of that manufacturer's product by trademark or name rather than, as previously, by a fungible goods system. The first requirement therefore of a modern day lumber printer and the requirement which is met by the instant invention is that the printer must mark or imprint a clear, legible, neat and precisely centered trademark or firm name in one or both ends of a board.

The prior art of end printing lumber is exemplified by United States Patent No. 2,047,746 entitled "Lumber Marking Mechanism" of which I am assignee of the entire interest. Therein is disclosed a table having a printer located along each edge thereof. The two printers are aligned one with another across the table and boards of uniform and constant length are fed to the printers whereupon a trademark or firm name is simultaneously printed upon both ends of the board by rotating dies as the board moves. This simultaneously was a requirement of the prior art since lumber printing extends an investment force or thrust and two opposed printers could apply equal and opposite forces to the ends of the board simultaneously to push a die or rubber-faced type against the end grain of the wood. Were both ends not printed simultaneously, the board merely would move endwise out of the way when the printer pressed upon one end thereof and no legible mark would result.

The obvious disadvantage of the above described double end printer is that all lumber must be sorted to length prior to being marked, the printer being capable of operating with but one length of board at a time. Recalling for a moment the intensely competitive nature of the present day lumber industry, this requirement for sorting to length fast is approaching the status of what can be termed an economic failure. Thus, sorting is done by hand and is a needless labor expense operating to the economic disadvantage of the lumber mill forced to rely thereon to obtain a marked or printed product. One object of the instant invention is to provide a printer which will handle random lengths and thus will eliminate the requirement for sorting prior to marking, the resultant decrease in labor expense operating to the economic advantage of the mill employing the invention.

The most apparent solution to the problem of providing a single end printer and a consequent practice of random length printing on moving boards is to hold the board while the mark is applied. Three factors heretofore have prevented the use of a mechanism which will hold or fix the relative position of a board during printing. Firstly, efforts to push on one end while marking the opposite end and thus to hold the moving board against endwise movement during printing or marking have proven impractical. Where the endwise force was exerted upon the end opposite to the being marked, the point of application varied over wide distances since random lengths may vary as much as ten or twelve feet. Since the position of the printer was fixed, the force thus would need be applied at a point which could vary as much as ten or twelve feet. Secondly, efforts to hold or restrain endwise movement by pressing down as with a steel roller or runner on an intermediate portion of the board without stopping the endwise movement heretofore proved futile or impractical since the force required often is 300 to 600 pounds. A hold down force of this magnitude easily can mar, mark, or deface the surface of the finished board, thereby impairing the merchantability. A third method of marking random lengths is to stop each board and board and board against endwise movement while the printing is effected. This method is impractical, however, since the printer is employed in conjunction with other high speed conveyors and mechanisms within a lumber mill. For example, a printer may be employed before or after a high speed automatic or selective trimmer saw or one or more planers. Modern trimmer saws now handle upwards of 75 boards a minute and the printer should operate at the same speed to prevent a bottleneck from developing in the flow of work through the mill. This speed prohibits the employment of a method which stops and holds each board while a mark is applied. Additionally, efforts to stop a fast moving board have demonstrated that it is difficult to prevent physical damage, marring, or defacing. Thus, a continuous flow at constant speed is more practical.

Having in mind the above disadvantages of the prior art and the practical considerations inherent in a solu-
tion thereof, I have turned my inventive efforts toward the provision of the novel, high speed printer which will handle Lumber Transfer Mechanism, and I claim the option of the operator, of random widths and thicknesses as well. This printer is of a particular utility when employed in a conjunction with the lumber transfer mechanism disclosed and claimed in my copending application Serial No. 458,475 filed September 27, 1954 and entitled Multidirection- 

In brief summary, the transfer mechanism above mentioned moves boards one by one at a high rate of speed along a table having a printer or marker adjacent each edge thereof. In contrast to prior printers, however, those of the instant invention are not aligned for simultaneous printing of both ends but rather are spaced longitudinally of the table so as to mark the opposite ends of a board in succession. That is to say, where both ends are to bear a trademark, first one end and then the opposite end is printed. In conjunction therewith, the transfer mechanism moves a board into engagement with novel hold down rollers adjacent the first marker where a firm name or trademark is applied thereto. Thereinafter, the board is moved both edgewise and endwise across the table into engagement with a second novel hold down mechanism whereupon the second end of the board is marked.

As a feature of the instant invention and where desired, additional automatic measurement, selector, and adjustment mechanisms may be incorporated with the printer to measure either or both the thickness and width of an advancing board as it approaches the printer and, thereinafter, to adjust the position and/or the timing of the marker in accordance with that measurement so as to locate the mark midway of the thickness and width upon the end of the board. This center position is preferred both by Canadian and American mills. Still further, the printing and adjusting thereto may be accomplished with my inventive mechanism at a speed of upwards of 75 boards a minute thereby allowing the mechanism to be utilized in conjunction with other automatic lumber machinery in a modern, high speed mill. Each of these provisions, it will be noted, is in a direct service to the principal object of my invention, which object is to provide a high speed printer which will mark boards of random length and/or width and/or thickness on either one or both ends with precision, neatness and clarity.

Another object of my invention is to provide an automatic measurement, selector and adjustment mechanism which first will measure the width and thickness of a moving board, next will operate and adjust a lumber working mechanism in accordance with that measurement and, finally, will reset itself to the original position prior to measuring the width and thickness of the next succeeding board. In conjunction with a single end printer such as is a part of the instant invention, this measurement, selection, adjustment, and reset all can be accomplished with precision and accuracy upon boards which are traveling in excess of 180 to 200 feet per minute.

Another object of my invention is to provide a lumber marker or printer in combination with a novel hold down mechanism whereby a board which is travelling at a high rate of speed can be printed or marked on one end only without physical damage or marring of the finish. Furthermore, in conjunction therewith, it is an object of my invention to provide a mechanism for paraffin coating the marked end of a board immediately after the trademark or firm name is applied and while the board continues to move at a high rate of speed.

Yet another object of my invention is to provide a single end lumber printer wherein but one end of a board can be marked, the board being held or gripped adjacent that end only against endwise movement during the marking without damage to or defacing of the surface of the board.

As a corollary to the last stated objective, it is a further object to provide a novel roller type hold down means for a moving board which is being marked, the surface of the roller being yieldable and elastic so as not to deform the lumber and the entire roller mechanism being correlated with a rider wheel which carries the roller up onto the surface of a moving board in a gentle, smooth manner assuring a fast operation with minimal chance of physical damage to the board.

A related further object of my invention is to provide a roller type hold down mechanism for a single end lumber printer whereby adjustable pressure means are correlated to the roller yieldably to hold the roller in engagement with the surface of the moving board with a preselected force of a magnitude which can be correlated to the softness or hardness of the lumber and to the force which the printer exerts when pressing a mark into the end grain of a board. This objective allows the printer to be used with various species of wood and with various types of die faces.

These and other desirable objectives, capabilities, and advantages inherent in and encompassed by the instant invention will become apparent from the ensuing description, taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a combination plan view and work flow diagram of a multidirectional lumber transfer mechanism used in conjunction with two spaced single end printers, a number of individual boards being shown in progressive and sequential positions across the mechanism and the movement or flow of these boards being indicated diagrammatically by direction arrows;

Fig. 2 is a detail section of the hold down mechanism associated with the printer showing both the adjustable pressure means and the adjustable limit means for the upper one of the rollers, this figure being taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is a detail plan view, taken substantially on the line 3—3 of Fig. 2, showing a board in progress through the mechanism the instant before the die face of the single end printer comes in contact therewith and showing the paraffin coating mechanism which may be located immediately after the printer;

Fig. 4 is a diagrammatic illustration looking at the edge of a moving board at the instant it is marked and as the opposed hold down rollers grasp and grip the end thereof, the direction of rotation of the rollers, the endwise force exerted thereby and the endwise force exerted by the printer as it marks all being indicated by arrows;

Fig. 5 is a structural detail correlated to Fig. 4 but showing the actual arrangement of parts at the instant the die face of the printer contacts the end of a board, this figure serving to illustrate the yieldable, elastic nature of the rollers and the manner in which they become deformed as they oppose the endwise thrust of the die face;

Fig. 6 is a cross sectional detail, taken substantially on the line 6—6 of Fig. 2, showing the paraffin coating mechanism with a moving board being coated thereby;

Fig. 7 is a partial detail showing the board partially marked and still in contact with the moving or revolving face of the printer, this figure better illustrating the manner in which the die actually presses into and compresses the end grain of the board;

Fig. 8 is a schematic wiring diagram utilizing symbols combined with portions of the actual structure in order to illustrate the function of the multiple measurement, selector, and adjustment mechanism which measures the width and thickness of a moving board and adjusts the position of the marker and the relative timing of the marker in relation to the conveyor in order to position the mark midway of the thickness and width of a moving board;

Fig. 9 is a partial detail of the mechanism which adjusts the vertical position of the die to print midway the thickness of a board, this figure being taken substantially on the line 9—9 of Fig. 6; and
Fig. 10 is a partial section detail, taken substantially on the line 10—10 of Fig. 8, showing the differential per se whereby the position of the die relative to the conveyor is adjusted while both of these elements continue to operate and to move a board at high speed.

Transfer mechanism

Fig. 1 is a flow diagram combined with a plan view looking down on the top of a table 15 with which the various elements of a pair of single end printers W and the multidirectional transfer mechanism are associated. Thus, Fig. 1 illustrates the most complex and the most complete form of my invention just as the other figures illustrate complete combinations of the detailed elements. In Fig. 1, a number of boards B are shown in various positions across the table 15 and both the left and right edges of the drawing have been foreshortened. The specific details of the multidirectional lumen transfer mechanism are disclosed in my previously mentioned copending application of the same name and need not be restated here. A correct understanding of the function of this lumen transfer mechanism is, however, related to the function of the single end printer and will be explained briefly.

To the above ends, it will be recognized that the left edge of Fig. 1 indicates that the table 15 may be joined to or may be a continuation of a trimmer saw or other lumen mill apparatus. Trimmer saws generally are of two types, an "automatic" trimmer saw being one which receives boards and squares the ends while trimming to an exact preselected length and a "selective" trimmer saw being one which, in addition to the above functions, simultaneously removes defective intermediate sections such as large pitch pockets, broken sections, open knots, holes, and the like as they appear.

A number of two foot intervals are indicated along the left edge of Fig. 1. These intervals correspond to an exemplary spacing of the saws in either an automatic or a selective trimmer. Assuming for purposes of illustration that it is a selective trimmer which is illustrated, a saw is located at each of the two-foot stations from zero to twenty feet. Lumen transfer chains move individual boards edgewise past the saws where the ends are squared and defective intermediate sections are cut out. In Fig. 1, the feed chains 16 carry the customary lugs for engaging a board and these chains may be the off bearing feed chains from such a selective trimmer saw. The board B which is the closest to the left edge of Fig. 1 is being carried by this feed chain and four feet of defective section has been trimmed from its lower right end while the upper or left end has been squared at the 16-foot saw. The resultant board is 12 feet long and must be moved edgewise four feet before the end thereof can be printed or marked with the single end printer which is located within the housing or work station identified by the reference letter W.

To the right in Fig. 1, the foreshortening line may indicate, by way of example, that the lumen transfer mechanism precedes either a sorting chain from which the lumen is piled for delivery, or, in the Pacific Coast fir mills, from which the lumen is fed to a planer. In the latter cases, it is the practice to sort lumber to length prior to delivery to the planing mill for manufacture. Thus, similar chains 17 rotate and move at the same speed as the chains 16 to pick up a board after the first end has been marked at the station W and move it toward the second work station W where the opposite end is marked. It is the function of each of these stations W to impress and print a firm name, trademark, or grade mark into the end grain of a board while the board flows past at a constant speed carried by the chains 16 and 17.

In a modern, high speed lumen mill this speed may be upwards of 75 boards a minute yielding a velocity of 180 to 200 feet per minute and identical edgewise velocities are assured by a common drive originating with the electric motor 22.

In conjunction with the feed chains 16 and 17 for moving the boards B from left to right in Fig. 1, a plurality of rollers 18 move the boards endwise toward the first work station W and a plurality of rollers 19 move the boards B endwise toward the second work station W.

An exemplary electric motor, chain and sprocket type drive for the rollers 18 is shown at 20 and a similar exemplary drive at 21 rotates the rollers 19. Where desired, of course, the relative rotational velocity of the rollers 18 and/or 19 may be varied in accordance with one object of the invention disclosed in my previously mentioned copending application. Such a variance in velocity is not essential to either the correct functioning of or an understanding of the instant invention, however. Moreover, the single end printer within either of both stations W is useful either singly or in pairs and with or without the exemplary transfer mechanism illustrated in Fig. 1.

In brief description of the function of the transfer mechanism, upwards of 75 boards a minute flow from left to right across Fig. 1. These boards may be leaving a trimmer saw at the left end, and where this trimmer saw is of the selective type, the lengthwise dimension of the various boards B will vary over a wide range. Each board is carried from the trimmer across the smooth flat surface of the elongated table 15 by the lugged chains 16. This movement is in an edgewise direction and, in addition, the rollers 18 impart an endwise movement to each board B as the lugs carry the board up and onto the revolving periphery of the rollers. While both the lugs and the rollers are in contact with the board, of course, the motion imparted thereto is the combination of edgewise and endwise components substantially in the resultant direction indicated by the flow arrows of Fig. 1.

As a board B is moved both edgewise and endwise toward the first work station W, the end thereof is moved against a fence or guide means 23. It is the function of this fence or guide means frictionally to guide the end of the board toward a precise and a preselected alignment with the first work station W. At this first work station, the end of the moving board is marked as with a trademark. Thereafter, the lugs on the chains 17 pick up the lugs on the chain 16 leave off and the board is moved edgewise toward the right and endwise toward the top of Fig. 1 by the concurrent action of the lugs on chains 17 and the rollers 19. Adjacent the second work station W, the end of the board B contacts a second fence or guide means 24 whereupon that end is guided into precise and exact alignment with the printer which is located at this work station W. After the second end of the board is marked, the lugged chain 17 carries the board away to an end point of use such as a sorting table.

It is the mechanism which is located at each work station W and generally is housed within the boxes identified by the letter W which forms the subject matter of the instant invention and now will be described.

Hold down mechanism

Reference now will be had to the cross sectional elevation of Fig. 2 and the partial top view of Fig. 3 wherein a board B is shown moving across the table 15 in contact with the previously mentioned fence or guide means 23. The structural framework of each work station W may be defined by spaced vertical channel sections 25 having a housing or dust protector roof thereover. With this housing and upon this framework, a pair of boxlike or bifurcated arms 26 and 27 pivotally are mounted as at 28 and 29 respectively. It is the function of the arm 26 to journal an axle 63 rotatably to carry a idler type hold down roller 30. It similarly is the function of the arm 27 to journal an axle 64 rotatably to carry a hold down roller 31. Thus, in actuality, each of these arms is bifurcated or is formed with two separate pieces
in order to straddle the length and to journal both ends of the respective axles 63 and 64. In practice, both of the axles 63 and 64 preferably are arranged at an oblique angle as will be explained hereinafter.

An adjustment limit means is provided to limit the downward pivotal movement of each arm and each roller 50 and 51. This means consists of a pair of similar airplane type cables 52. Each cable is joined to an ear carried at the terminal end of the corresponding arm 26 or 27 and, thereinafter, is reeved about pulleys 33 and attached to a separate lever, stop, or other adjustable mechanism for fixing the end of the cable in a preselected position. When the arms and rollers 30 and 31 move upward and downward, of as at 41, the roller 30 alternates in a state of tension in order to stop the downward movement and in a state of slack or looseness permitting upward movement. By fixing the far end of the cable in a selected position, the lower limit of travel of the roller is defined.

In both Figs. 1 and 2, the outline of a bicycle type rider wheel 34 is illustrated. This rider wheel is journalled upon an axle 35 which is carried by a support 36 secured to the far side of the previously mentioned arm 26 as viewed in Fig. 2. In this manner, the rider wheel 34 and hold down roller 30 are mounted for independent rotation yet for simultaneous pivotal movement as an integral unit up and down about the pivot 28. As shown in Fig. 2, the periphery of the wheel 34 is arranged in advance of but above the periphery of the roller 30 so as to contact the edge of an advancing board B prior to the contact of the roller 30 and thus, to carry the roller smoothly up into position upon the top of the board. This helps prevent damage to the high speed boards as they move into position for printing.

In practice, the hold down roller 30 may function in conjunction either with the smooth top of the table 15 or with a second mated roller which is identified by the numeral 37 in Fig. 2. This latter roller is journalled for rotation about an axle 38 which is carried by a portion of the frame of the table mechanism. Thus, a board B which is moved between the rollers 30 and 37 frictionally is gripped thereby and held against endwise movement while the printing operation is effected. In conjunction therewith, it will be noted that boards of different thicknesses must be gripped by varying type face, and wood of varying hardness will require varying effective hold down pressures. One such mechanism for varying this hold down pressure is shown in Fig. 2.

In Fig. 2, the adjustable pressure means takes the form of an air piston and cylinder unit 39. The piston rod 40 of this unit is connected between the end of the previously mentioned arm 26. The top of the piston and cylinder unit 39 is connected with an air hose 42 whereby air of preselected pressure can be fed to the cylinder in order to push upon the piston with a preselected force. This force is transmitted to the arm 26 and roller 30 by means of the pivotal connection 41 and piston rod 40 as will be apparent. Additionally, it will be noted that this force is limited by the extreme position of the cable 32 and is yeildable in that as a board moves the rider wheel 34 and roller 30 upwardly, the rod 40 also is forced upwardly a short distance. As practical examples, I have found that an air pressure of twenty pounds fed through the hose 42 is sufficient in the pine country where the wood is somewhat soft. This pressure will exert a total gripping force between the rollers 30 and 37 of approximately three hundred pounds. In similar manner, an air pressure of approximately sixty pounds in the air hose 42 where employed in the fir country where the somewhat harder wood requires a gripping force of approximately six hundred pounds to oppose endwise movement of a board.

Printer and differential

Turning now to Fig. 3, the details of the inker, die and associated mechanism will be described. To this end, a vertical spindle 43 is dovetail mounted for rotation in the direction of the arrow upon a vertical shaft. The spindle shaft is driven from below the level of the table 15 as is all the printer and ink mechanism associated therewith in Fig. 3. For this purpose, I prefer to employ a drive which takes off from the head shaft so as to be in line therewith. Such a drive is illustrated by the electric motor 22 shown driving the chains through the head shaft in Fig. 1. The chain and sprocket drive 44 which also is shown in Fig. 1 enters and operatively is connected with the mechanism of the work station W. As will be apparent, the movement provided by this chain and sprocket drive 44 is then transmitted to the conveyer or, of course, is translated into a rotational movement of the aforementioned spindle 43 through the medium of a differential illustrated in Fig. 10.

Referring to Fig. 10 for an instant, there is shown an input shaft 45, an output shaft 46, a driven gear 47, a driven gear 48, and a pair of transfer gears 49 and 50. This differential is a conventional machine element and the function thereof will be apparent. It is the input shaft 45 which is driven by the chain and sprocket mechanism 44 and it is the aforementioned spindle shaft and spindle 43 which are driven by the output shaft 46. Additionally, it will be noted that the shafts or axles of the two transfer gears 49 and 50 are mounted upon a rotatable change gear 50. In actuality, this change housing 50 is formed with teeth about the outer periphery thereof in definition of a gear.

In explanation of the function of the above described differential and spindle mechanism, it will be noted that the spindle 43 carries a die 51. This die 51 is an engraved steel printing die with high face letters held in a dovetail slide in order to allow replacement of the die readily and quickly. It is the function of the die 51 to press a mark such as a trademark, grade mark, or firm name into the end of a moving board B as shown in Fig. 7.

Upon installation of the above mechanism, the lugs carried by the chain 16 and the drive 44 are connected and are timed so as to present the end of a board to the die 51 each or every other time the spindle 43 rotates. This precise relative timing is effected through the cooperation of the chain and sprocket drive 44 and the differential mechanism of Fig. 10. All boards which are to be printed, however, are not of the same width and it is preferable that the mark be pressed into the exact center of the board. It is for this reason that I employ the differential of Fig. 10 and thereby am enabled to mark midway of the width of a board merely by effecting an adjustment of the change housing 50 in the differential mechanism. Thus, rotation of this change housing 50 in one direction advances the position of the spindle 43 and die 51 relative to the position of the end of the board as it rides in front of the lugs carried by the chain 16. Rotation in the opposite direction retards the relative position. By way of example, the passage of a narrow board such as a two-by-four (two inches thick and four inches wide) will require that the differential of Fig. 10 advance the relative position of the die face 51 to print closer to the lug. Passage of a relatively wide board such as a two-by-twelve will require that these relative positions be retarded since the center of this board is farther from the lug. Expressed differently, this is for the reason that the die 51 must, in a manner of speaking, wait or be delayed in making contact with the wider board in order exactly to mark the center thereof.

Returning to Fig. 3, the chain and sprocket drive 44 of Fig. 1 also rotates a worm 52. This worm, in turn, meshes with the worm gear 53 to operate the following described mechanism. Thus, 54 indicates an ink well in which a pickup cam 55 is rotated by the worm gear 53 in order to apply a thick or viscous printer's ink to an applicator roller 56. Cooperating rollers for transferring
the ink from the periphery of the applicator roller 56 to the face of the die 51 include a ductor roll 58, a transfer roll 59, and a spreader roll 59. The transfer roll 58 is in physical contact with the face of the die 51 once during each revolution of the spindle shaft and spindle 43. Additionally, the ink pickup cam 55 and associated rollers are in continuous operation and rotation to supply ink to the transfer roll 58. This portion of the structure is similar to the corresponding structure in United States Patent Number 2,047,746 and reference may be had therefor for additional details. Thus, each time the die face 51 contacts and presses into the end grain of a board B, a deep, inked mark is applied thereto.

**Coater**

Immediately adjacent the printer die and ink mechanism, I prefer to locate the paraffin coating mechanism shown in Figs. 3 and 6. This mechanism includes a smooth beveled steel roller 60 which, once again, is rotated by means of power supplied by the chain and sprocket mechanism 44 of Fig. 1. The roller itself is beveled and is mounted so as to contact the end of a board B with a flat face arranged normal to the plane of the board end in the manner shown in Fig. 6. Additionally, a paraffin well 61 having a heater coil 62 continuously applies warm paraffin to the periphery of the roller 60. It is the function of this paraffin coating mechanism to coat the end of a board immediately after the mark is applied to it for the prevention of checking or cracking and as a preservative feature. Additionally, the immediate coating of the inked mark inhibits air drying of the ink from the outside in and promotes soaking of the ink into the end fibers of the board. In this manner, I am able to produce a cleaner, a more legible and a more deeply impressed trademark, firm name or grade mark.

**Rollers**

Turning now to a comparison of Figs. 2 and 3 with Figs. 4, 5 and 6, the exact preferred construction of the three idler rollers 31, 38 and 37 will be explained. To this end, the roller 30 rotates about the axle 63, the roller 31 rotates about the axle 64, and the roller 37 rotates about the axle 38, each of these being an idler as opposed to a driving roller. Each of the idler purposes is disposed at an oblique angle and is canted somewhat toward the outboard edge of the table 15 while retaining a parallel relationship between the adjacent axles and the upper surface of the table 15. This oblique disposition is best illustrated in Fig. 3 wherein the lower roller 37 is shown canted or inclined so as to move the board B endwise toward the edge of the table and toward the die 51. In similar manner, the roller 31 moves the board B inwardly against the periphery of the paraffin roller 60.

In the preferred construction, each of the rollers 30, 31, 37 is coated with a rather soft rubber or other yieldable elastic material over a steel or other hard core in order to provide a yielding, pliable, elastic surface. It is this surface which frictionally will grip and grasp the opposite faces of a board as it is fed between the rollers in the manner shown in Figs. 2 and 4 without marring or defacing the board. In Figs. 5 and 6, the yieldable elastic nature of the coating has been exaggerated somewhat in order to illustrate the manner in which endwise force is applied to the board B. Thus, the die 51 exerts a considerable endwise pressure and force against the board as the trademark is pressed into the end fibers. This force is opposed, in accordance with my invention, by the oppositely directed force which is generated by the oblique disposition of one or yielding, elastic surface of the rollers. In Fig. 4, the force thus applied in one direction is represented by the arrow 65 and the force equal and opposite thereto which is applied by the rollers 30 and 37 is represented by the three small arrows on the board B. The degree of force which is exerted by the rollers is, of course, variable and the magnitude thereof can be preselected by adjusting both the air pressure in the board end in the tank 50 and the initial spacing of the rollers as determined by the cable 32. I have found that a more or less standard ten letter die having a broad face exerts a force of approximately three hundred pounds in the direction of the arrow 65 of Fig. 4 while marking the end of a pine board. On the other hand, six hundred pounds is exerted with the same die while marking fir. Accordingly, the hold down pressure of the rollers 30 and 37 must be varied to meet this change in force when a different species of wood is marked. Such an adjustment is effected quickly and readily by varying the air pressure in the line 42 to change the pressure exerted.

Whereas the two rollers 30 and 31 grasp and grip the end only of a board and push it longitudinally toward the die face while permitting edgewise movement of the board, the roller 31 which holds the board against the paraffin roller 60 acts in cooperation with the surface of the table. Thus, the paraffin roller 60 exerts a substantially smaller force and less pressure is required to keep the end of the board in brushing contact therewith. It is for this reason, that but one roller 31 is utilized with the paraffin mechanism whereas two opposed rollers are utilized with the printer or marker. Further, as will be apparent to those skilled in the art, the printer mechanism can be utilized either per se or, as illustrated, in conjunction with the paraffin mechanism. In addition, printers and/or paraffin coaters can be utilized either in pairs upon the opposed sides of the table 15 as shown in Fig. 1 or singly merely to mark and/or paraffin coat one end of a board. Single end printing and/or paraffin coating heretofore has not been practical in the art to the best of my knowledge and the provision therefore in conjunction with the hold down rollers is an important feature of my invention.

**Selector and measurement mechanism**

As previously set forth, it is a principal object of my invention to provide a printer which will mark boards of random length and/or width and/or thickness on either one or both ends with precision and clarity so as to yield a board of high, merchantable quality and with speed so as to make practical the use of the printer in high production lumber mills. To this end, heretofore has been required that the printer mechanism be stopped when an adjustment either for varying thickness or for varying width was effected. In Figs. 8, 9, and 10, however, I illustrate one preferred form of what is termed a selector and a measurement mechanism or means for effecting these operations whenever the printer is in operation and while boards continue to flow therethrough. An equivalent to this form employs one or more electric eyes instead of a mechanical feeler but the form illustrated is preferred.

In orientation among the elements shown in Fig. 8, the spindle 43 and die face 51 are shown adjacent the upper right hand portion of the figure, the differential mechanism (of Fig. 10) is shown adjacent the lower portion of this figure and a board is shown adjacent the upper left corner progressing through the mechanism across the top of the table 15. Additionally, it will be apparent that many of the other elements of the mechanism are represented by symbol devices better to explain their function. In this figure, the numerals 4, 6, 10, and 12, for example, have been applied to certain solenoids having reciprocable armatures which are spring biased towards retraction and are extended when the solenoids are actuated electrically. These numerals correspond to the common weights of lumber encountered in a modern mill except that in some mills a two scale board also may be well known. The dimensions of these boards are shown at the top of the figure. Corresponding to each of these first five solenoids, are a group of additional
actuation, hold and relay solenoids which control electric switches and which are numbered correspondingly but differing by multiples of one hundred. For example, energization of the hold down or relay solenoid 104 causes a normally open electric switch. An initial actuation of 104, in turn, is effected by the closure of another normally open electric switch under the control of a solenoid 204 that has an electric contact point 304. Each of the solenoids 6, 8, 10 and 12 also have corresponding actuation and hold down or relay solenoids as well as corresponding contact points for a pivotal switch arm 66.

As the direction arrows in Fig. 8 indicate, the pivotal switch arm 66 is spring biased toward abutment with the stop 83 by the spiral spring 82 and is positioned against the force of the bias by contact with the leading edge of a board by the roller 67. For example, the roller 67 is shown in contact with the edge of a two-inch board whereupon the end of the switch arm 66 contacts none of the switch points 394 to 312. Were this board, however, a four inch, a six inch, an eight inch, a ten inch, or a two inch board, the roller 67 would then point to the end of the switch arm 66 correspondingly over one of the three hundred series contact points for the instant that a measurement and an actuation are effective.

In the upper left hand portion of Fig. 8, I have shown a rotatable cam 68. This cam is rotated by the aforementioned chain and sprocket mechanism 44 so as to be timed with the feed chain of the transfer mechanism. This timing and proportioning of elements is arranged such that the cam 68 rotates exactly once each time a lug carried by the chain 16 passes a fixed point on the table 15. The projection of the cam 68 thereupon closes the normally open switch 69 against the spring bias which is built into a normally open switch. At the instant that this switch 69 is closed, the pivotal switch arm 66 is in position against the edge of a board as the lug carrying the board passes a reference point. In effect, this is a measurement of the width of that board. It is for this reason, that I term this mechanism a measuring means or a selector means for measuring the width of a moving board.

Progressing in explanation of Fig. 8, the two main feed lines for the electric circuit thereof are shown to the left as F. Immediately adjacent the lower of these, a main actuator solenoid 70 is in series with the switch 69 and is such that the relay current actuates a motor valve 71. This motor valve 71 is of conventional construction and is provided with a single air pressure inlet, a single air pressure outlet, and a pair of air pressure motor ports whereby the air or hydraulic pressure alternately is supplied to and exhausted from the opposite air pressure actuated piston and cylinder unit 72. The piston rod 73 of the unit 72 carries a rack 74 which meshes with and rotates the previously described rotatable change housing gear 50 to adjust the differential. With this mechanism, electrical energization of the main solenoid 70 will move the valve 71 to supply air pressure to the unit 72 and exhaust air from the left end thereof to move the piston, the piston rod 73 and the rack 74 toward the left as viewed in Fig. 8. Similarly, deenergization of the main solenoid 70 will allow a spring to return the valve to the opposite position to supply air to the left side of the unit 72 while exhausting air from the right side thereof. This will cause the rack 74 to return to its initial position and thus will adjust the differential to its original minimal position.

As shown in Fig. 8, the piston of the unit 72 has been proportioned such that movement toward the left produces a smaller effective piston area and thus will be effected with less force and at a slower speed than the corresponding return movement. In conjunction therewith, it is a function of each of the solenoids 4, 6, 8, 10 and 12 selectively to project an armature into the path of the advancing rack 74 for contact with the protruding lip 75. Such a contact forms a physical abutment which stops the movement of the piston rod 73 and effects a measured adjustment of the differential mechanism of Fig. 10. That is to say, the solenoid 4 is positioned such that energization of the solenoid and movement of the rack 74 to the left will cause the lip 75 to stop against the protruding armature of the solenoid. This movement of the rack adjusts the differential mechanism of Fig. 10 sufficiently to cause a relative positioning of the spindle 43 and the die face 51 whereby a mark is made exactly midway of the four inch width of an exemplary board B. This adjustment of the relative position of the die will remain effective until after the board passes by the revolving die face and is marked.

In summary of the above, the entire mechanism is termed a “width selector means” which is positioned in advance of the marker or printer and operatively is connected with the actuation means thereof in order to measure the width of a moving board and adjust the timing of the marker or printer relative to the conveyor in order to mark midway of the width of a board thus measured. As will be apparent, when a two inch board is measured by the end of the pivotal switch arm 66, no actuation of the electric circuit takes place and the differential mechanism of Fig. 10 is not adjusted. This lack of adjustment corresponds with the original positioning of the die face 51, which positioning will mark midway of a two inch width board. As will be apparent, the lumen dimensions above used are exemplary only and other and varying dimensions may be incorporated in the selector and measurement means without departing from the theory, spirit and scope of the invention.

In cooperation with or independent of the width selector, at the option of the installer, I make provision for a “thicken selector means.” This latter mechanism functions to measure the thickness of a moving board and adjust the vertical position of the marker or printer to mark midway the thickness of the board. Referring to Figs. 8 and 9, the spindles 43 and die 51 will be seen to be mounted for vertical adjustment with respect to the spindle shaft, vertical adjustment being indicated by direction arrows in Fig. 9. Assuming for a moment that the reference or basic board thickness encountered by the printing mechanism is one inch, yet two inch boards also are common, this adjustment will move the spindle and die between two positions. That is to say, the spindle 43 and die 51 normally will be positioned to mark midway the thickness of a one inch board yet adjustment will be afforded to lift the spindle 43 and die 51 vertically to mark midway the thickness of a two inch board. Where other dimensions are encountered, the mechanism as here described can be duplicated, for three or four adjustments, tripled, for four or five adjustments, and so forth.

To the above end, a single vertical positioning solenoid 1 is sufficient to effect a two position adjustment. The armature of this solenoid is joined to a bifurcated pivot arm 76 (see Fig. 9), pivoted at 77, and carrying a pair of rollers 78 at the terminal ends thereof. Electrical actuation of the solenoid 1 withdraws the armature into the coil and pivots the left end of the arm 76 downwardly about the pivot 77. This causes the opposite end of the arm and the rollers 78 to rise vertically, moving the spindle 43 and die 51 vertically upward. Continued rotation of the spindle and die are accommodated, of course, by the groove within which the rollers 78 are positioned.

Referring now to Fig. 8, the solenoid 1 is controlled by a hold or relay solenoid 101 which closes a normally open switch when actuation of an actuation solenoid 201 to close a similarly normally open switch. The solenoid 201 is joined to an electric actuator switch 301 having a protruding switch blade arm 79 with a roller 80 at the terminal end thereof. The roller 80 is positioned adjacent the end of the board B for riding contact therewith. The switch 301 normally is open with
the solenoid 201 deenergized and this position of the elements is maintained so long as one inch boards are passing. Passage of the exemplary two inch thickness, on the other hand, will cause the roller 80 to move upwardly as it rolls across the top surface of the board. This causes the switch blade arm 79 to close the switch 201 momentarily thereby energizing the solenoid 201 for the same short instant. Closure of the switch controlled by the solenoid 201 then completes the electric circuit through the hold or relay roller 101 to energize the solenoid 1 and effect a vertical movement of the spindle 43 and die face 51. This vertical adjustment is maintained even after the roller 80 leaves the surface of the board since the solenoid 101 acts as a hold relay. I term this entire mechanism a thickness selector means which is arranged in advance of the marker or printer and operatively is joined thereto for measuring the thickness of a moving board and adjusting the vertical position of the marker or printer to mark midway of the thickness of the board so measured. This thickness selector means is located distantly from the marker and is provided with electrical operative interconnection therewith in the manner above described.

To reset the electric circuit of Fig. 8 after a portion thereof has been energized, I provide a reset means in the form of a normally closed switch 81 which again is positioned for contact by a moving board B. This switch 81 is actuated by a roller after contact with either the edge of the top surface of a board immediately after the board is marked. In this manner, the switch 81 is opened by contact with the moving marked board in order to open the main circuit and reset each of the solenoids and electrical elements thereof. Simultaneously, the solenoid 70 is deenergized and the piston and cylinder unit 72 returned to the right extreme position to reset the differential.

Operation

In automatic operation of my single end printer and selector mechanism, upwards of 75 boards a minute will flow from left to right across the table 15 in Fig. 1. These boards, one by one, will be fed to one or first to one and then to the other of the work stations W. Within each of these stations W is located substantially the entire mechanism, both mechanical and electrical, illustrated in the remaining figures of the drawings.

As a board reaches the position illustrated in Fig. 8, the bottom cam 53 engages the fixed arm 66 momentarily to complete the electric circuit through the switch arm 66 and main actuator solenoid 70. Presuming that the board thus contacted is a two by six (two inches thick and six inches wide), the roller 67 will be in contact with the front edge of this board and will be moved ahead a sufficient distance to complete the circuit across the contact point 306 at the precise instant the switch 69 is closed. This completion of the circuit is of but momentary duration since the board is traveling at a high rate of speed (perhaps 180 feet per minute) and the high point on the cam 68 is of but limited dimension. Accordingly, a pulsed or instantaneous surge of current is fed through the solenoid 206 to close the switch controlled thereby. This switch closure thereafter actuates the hold solenoid 106 to close the switch joined therewith and to retain the electric circuit in an actuated condition. The switch arm 66 then can rotate off of the board and return to its initial position under the influence of the spring 62 and against the stop 83 and the high point on the cam 68 can allow the switch 69 to open all without influencing the hold circuit or the action of the differential mechanism in Fig. 10 and the solenoid 1 in Fig. 8.

Simultaneous with the closure of the switch 69, of course, the main valve solenoid 70 has been actuated by the energized hold or relay solenoid 106. Completion of the circuit through the solenoid 70 also actuates the solenoid 6 to project the armature thereof into the width of the advancing board 75. As formerly described, the lip has been effected through the operation of the motor valve 71 and the air controlled piston and cylinder unit 72 as previously described. When the lip 75 contacts the protruding armature of the solenoid 6, movement of the piston rod 73 and rack 74 is stopped and these elements will remain in this condition until a reset operation is effected. In function, this series of actions has caused the spindle 43 and die 51 to be adjusted relative to the timing of the conveyor in order to position the mark midway of the six inch width of the advancing board B.

If the six inch board under discussion were of one inch thickness, the thickness selector means 79, 80, 301 would not effect an actuation of the solenoid 1. If, on the other hand, the six inch board is two inches in thickness, the roller 80 will contact and roll over the top surface of the board thereby raising the arm 79 and closing the switch 201. As previously described, this closure will effect a temporary surge of current through the solenoid 201 in order to close the switch associated therewith and energize the hold solenoid 101. The thickness adjustment circuit then remains energized after the roller 80 leaves the board. The die 51 and spindle 43 are adjusted vertically as required to position the mark midway of the thickness of the board by energization of the solenoid 1. It should be noted in this connection that the dimensions one inch and two inches as to board thickness are but exemplary and two and four inches or other varying dimensions could as easily be utilized where desired.

Once an adjustment for width has been effected on the moving spindle and die, the board B will advance to the position of Fig. 2. At this point, the opposed rollers 30 and 37 grasp and grip the end of the board frictionally, the roller 30 having been carried up onto the upper surface of the board by the rider wheel 34. As the end of the board is held against endwise or longitudinal movement but is permitted to advance edgewise, the die 51 swings into contact with the end thereof and prints the firm name, grade mark, or trademark, as illustrated in Fig. 7. The endwise force exerted by this pressing of a mark into the end grain of the wood is opposed by the yieldable elastic surface of the rollers 30 and 37, as illustrated in Fig. 6. Further, the position of the mark is exact as prescribed for that particular board by the rollers 67 and 80.

After the board leaves the marker or printer, it is advanced into contact either with the roller of the switch 83 or with the roller 31 to be paraffin coated as shown in Fig. 6. Immediately before or immediately after, paraffin coating, at the option of the operator and recalling that some mills may not use a paraffin coat at all, the reset mechanism actuated by the normally closed reset switch 81 comes into play. With this switch, the advancing edge or the top surface of the board contacts the roller to open the switch thereby breaking or opening through the entire hold and actuation portion of the electric circuit in Fig. 8. In function, I term this reset mechanism a "reset means" which is connected with the actuation means for advancing the board and operating the marker in order to reset both the timing of the actuation means relative to the conveyor (through the differential) and the vertical position of the marker after the end of a board is marked.

As now will be apparent, the width and/or the thickness selector means each or both are capable of use in conjunction with mechanisms other than a printer. Thus, were the work station W in Fig. 1 occupied by a profile saw intended to cut a groove in the end of a board, such a saw could be adjusted in vertical position by employing the switch 301 and associated mechanism. Similarly,
were work to be accomplished on the end of a board which was related to the width thereof, the width selector mechanism being employed. These examples illustrate the versatility of the various elements of my inventive mechanism and other uses will present themselves to those skilled in the art. In summary, it will be seen that I have provided a single end lumber printer which will mark boards of random length and width and thickness. In addition, this printer is effective to mark either one or both ends of a board with precision and clarity. In the present day, highly competitive condition of the lumber market and in the increasing use of trademarks and firm names thereon, this invention allows boards of high, merchantable quality to be marked with that speed which is required in the high production, modern day lumber mill. In broad terms, the invention thereby will contribute to and will accelerate the revolution in the marketing of lumber from a fungible goods system to a graded, trademarked or firm name marked system of individually identified boards. I claim: 1. In combination with single end lumber marker means for pressing a mark into the end grain of one end only of each board in turn as plural boards are moved one by one edgewise past the marker means, held down means adjacent said marker means engageable yet rotatable with the edgewise movement of said end of the board as it is marked to resist endwise movement while allowing edgewise movement of the board past the marker means, said hold down means including a vertically adjustable journaled roller adapted frictionally yet yieldably to contact and roll upon the surface of the moving board, said roller having an elastic surface engaging the face surface of the board adjacent the roller means and having means for constraining axial movement of said roller in response to pressure exerted against the end of the board. 2. In combination with single end lumber marker means for pressing a mark into the end grain of one end only of each board in turn as plural boards are moved one by one edgewise past the marker means, said marker means including a constantly rotatable die means adjustable both vertically and in relative angular position while the marker means is in operation and the die is rotating, hold down means adjacent said marker means engageable with said one end of each board as it is marked to resist endwise movement of the board away from the marker, said hold down means including a vertically adjustable journaled elastic surfaced roller and means constraining axial movement thereof in response to pressure exerted against the end of said board, said elastic surfaced member adapted frictionally yet yieldably to contact and roll upon the face surface of a moving board, and adjustable pressure means bearing upon said roller to urge the same toward said frictional contact with a force of preselected magnitude. 3. A high speed single end lumber marker, comprising lumber marker means for pressing a mark into the end grain of one end only of each board in turn as plural boards are moved one by one edgewise at a constant velocity past the marker means, hold down means adjacent said marker means engageable with said one end of the face surface of a board as it is marked to resist endwise movement while allowing edgewise movement past the marker means, and selector means in advance of said hold down means for identifying the width of each moving board; means for approaching said marker means and for adjusting the relative position of the marker means in accordance with that identification in order to mark midway of the width on the end of the board, said selector means being operable to effect such an adjustment while the marker means is operating and during the interval between the moment the marker means completes mark-
situely directed endwise force while marking the end grain of the board, and means for measuring the width of a moving board prior to marking and for adjusting the relative position of the marker means to position the mark midway of the width of the board.

9. A single end printer for marking one end only of lumber of random length, width and thickness, comprising conveyor means for moving a board edgewise, means engageable with the face surface of the one end only of a moving board to exert an endwise force thereon, rotatable marker means correlated to said conveyor means and engageable with said one end only to exert an oppositely directed endwise force while marking the end grain of the board, and multiple selector means correlated to said conveyor means for measuring the width and thickness of a moving board prior to marking and for adjusting the position of the marker means while the board is moving and the marker means is rotating to position the mark midway of the thickness and width of the board.

10. A single end lumber printer, comprising a table having conveyor means for moving a plurality of equispaced boards edgewise therealong, a vertically adjustable marker adjacent one edge of said table operative to press a mark into the end grain of one end only of a board, actuation means operatively but adjustably in time with said conveyor and joined to said marker means for the marker means into operative position to mark the end of a board each time a board is moved therepast by said conveyor, hold down means adjacent said marker means for frictionally contacting and gripping the face surface of said one end only as it is marked to push the board endwise toward and against the marker means, said hold down means including a vertically movable elastic surfaced roller journaled for rotation above said table about an axis inclined toward said marker as measured from the longitudinal dimension of said lumber with the periphery of the roller normally lying closely adjacent the surface of the table, said roller being constrained against axial movement in response to pressure against the one end of the board, and adjustable pressure means bearing upon said vertically movable roller with preselected force yieldingly to hold the same down toward engagement with the surface of a board.

11. A single end lumber printer, comprising an elongated flat table having conveyor means for moving a plurality of equispaced boards edgewise therealong at a constant speed, a marker means for adjacent one edge of said table operative to press a mark into the end grain of one end only of a board, actuation means operatively but adjustably in time with said conveyor and joined to said marker means for the marker means into operative position to mark the end of a board each time a board is moved therepast by said conveyor, vertically movable hold down means adjacent said marker means for frictionally contacting and gripping said one end only as it is marked to push the board endwise toward and against the marker, said hold down means including a pair of elastic surfaced rollers journaled for rotation about parallel but vertically spaced axes for engaging the peripheries of the rollers spaced a distance less than the thickness of a board, rider wheel means operatively carrying the upper one of said rollers with the periphery of the wheel in advance of but above the periphery of the roller so as to contact an advancing board and carry the roller up onto the board, and adjustment means operatively engaging the upper one of said rollers to limit the downward movement thereof.

12. A single end lumber printer, comprising a table having conveyor means for moving a plurality of equispaced boards edgewise therealong, a marker adjacent one edge of said table operative to mark but one end of a board, actuation means operatively but adjustably in time with said conveyor and joined to said marker to move the marker into operative position to mark the end of a board each time a board is moved therepast by said conveyor, width selector means in advance of said marker and operatively connected with said actuation means for measuring the width of a moving board, and for adjusting the timing of the marker relative to the conveyor to mark midway of the width of the board so measured, and reset means connected with said actuation means for resetting the timing of the actuation means relative to the conveyor immediately after the end of a board is marked.

13. A single end lumber printer, comprising a table having conveyor means for moving a plurality of equispaced boards edgewise therealong, a vertically adjustable marker adjacent one edge of said table operative to press a mark into the end grain of one end only of a board, actuation means operatively joined to said marker to move the marker into operative position to mark the end of a board each time a board is moved therepast by said conveyor, thickness selector means in advance of said marker and operatively joined therewith for measuring the thickness of a moving board and adjusting the vertical position of the marker to mark midway of the thickness of the board so measured, hold down means adjacent said marker means for frictionally contacting and gripping said one end only as it is marked to push the board endwise toward and against the marker, and reset means connected with said actuation means for resetting the position of said marker after the end of a board is marked.

14. A single end lumber printer, comprising a table having conveyor means for moving a plurality of equispaced boards edgewise therealong, a vertically adjustable marker adjacent one edge of said table operative to mark the end grain of one end only of a board and immediately thereafter to coat the marked end with a protective material in protection against checking, actuation means operatively but adjustably in time with said conveyor and joined to said marker to move the marker into operative position to mark the end of a board each time a board is moved therepast by said conveyor, width selector means in advance of said marker and operatively connected with said actuation means for measuring the width of a moving board and adjusting the timing of the marker relative to the conveyor to mark midway of the width of the board so measured, thickness selector means in advance of said marker and operatively joined therewith for measuring the thickness of a moving board and adjusting the vertical position of the marker to mark midway of the thickness of the board so measured, hold down means adjacent said marker means both being located distantly from said marker and having electrical operative interconnection with the actuation means therefore, hold down means adjacent said marker means for frictionally contacting and gripping said one end only as it is marked to push the board endwise toward and against the marker, and reset means connected with said actuation means and said marker for resetting both the timing of the actuation means relative of the conveyor and the vertical position of the marker after the end of a board is marked.

15. A single end lumber printer, comprising an elongated flat table having conveyor means for moving a plurality of equispaced boards edgewise therealong at a constant speed, a vertically adjustable marker adjacent one edge of said table operative to press a mark into the end grain of one end only of a board, actuation means operatively but adjustably in time with said conveyor and joined to said marker to move the marker into operative position to mark the end of a board each time a board is moved therepast by said conveyor, width selector means in advance of said marker and operatively connected with said actuation means for measuring the width of a moving board and adjusting the timing of the marker relative to the conveyor to mark midway of the width of the board so measured, vertically adjustable hold down means adjacent said marker means for frictionally contacting and gripping said one end only as it is marked to push the board endwise toward and against the marker, said hold down
means including a pair of elastic surfaced rollers jour- 5
nalled for rotation about parallel but vertically spaced 10
axes inclined toward said marker as measured from the 15
longitudinal dimension of said lumber with the periph-
eries of the rollers normally spaced a distance less than 20
the thickness of a board, adjustable pressure means bear-
ing upon the upper one of said vertically movable rollers 25
with preselected force yieldingly to hold the same down 30
ward engagement with the surface of a board, and ad-
justment limit means operatively engaging the upper one 35
of said rollers to limit the downward movement thereof.

16. In combination; an elongated table having con-
evoyer means for moving a plurality of equispaced boards 40
edgewise therealong; positionable work means adjacent 45
one edge of said table for performing work of a pre-
selected character upon one end only of a board; actua-
tion means operatively but adjustably in time with said 50
conveyor and joined to said work means to actuate the work 55
means each time the end of a board is moved there-
past by the conveyor; and thickness selector means in ad-
vance of said work means and operatively connected with said 60
work means for measuring the thickness of a moving board 65
and adjusting the operative position of the work means 70
to perform said work in a preselected position rela-
tive to the thickness of the board so measured; and reset 75
means connected with said actuation means for resetting 80
the timing of the actuation means relative to the conveyor 85
immediately after work is performed upon the end of a board of more than said minimum dimensions.

20. In combination; an elongated table having con-
evoyer means for moving a plurality of equispaced boards 90
edgewise therealong at a constant speed; positionable 95
work means adjacent one edge of said table for perform-
ing work of a preselected character upon one end only 100
of a board; actuation means operatively but adjustably 105
in time with said conveyor and joined to said work means 110
to actuate the work means each time the end of a board 115
is moved therepast by the conveyor; and thickness selector 120
means in advance of said work means and operatively 125
connected with said actuation means and said work 130
means, respectively, for measuring the width and thick-
ness of a moving board and adjusting the timing of the 135
work means relative to the conveyor and the operative 140
position of the work means to perform said work in a 145
preselected position relative to the width and thickness 150
of the board so measured; width selector means oper-
ating operative to adjust the timing of the work means 155
relative to the conveyor and said thickness selector means 160
being operative to adjust the operative position of the 165
work means only when a board exceeding a preselected 170
minimum width and thickness, respectively, is measured 175
thereby; and reset means connected with said actuation 180
means and said work means for resetting both the tim-
ing of the actuation means relative to the conveyor 185
and the operative position of the work means im-
immediately after work is performed upon the end of a board of more than said minimum dimensions.

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