

March 15, 1960

D. E. MOSELY
LUMBER STACKER

2,928,559

Filed Feb. 25, 1957

7 Sheets-Sheet 1

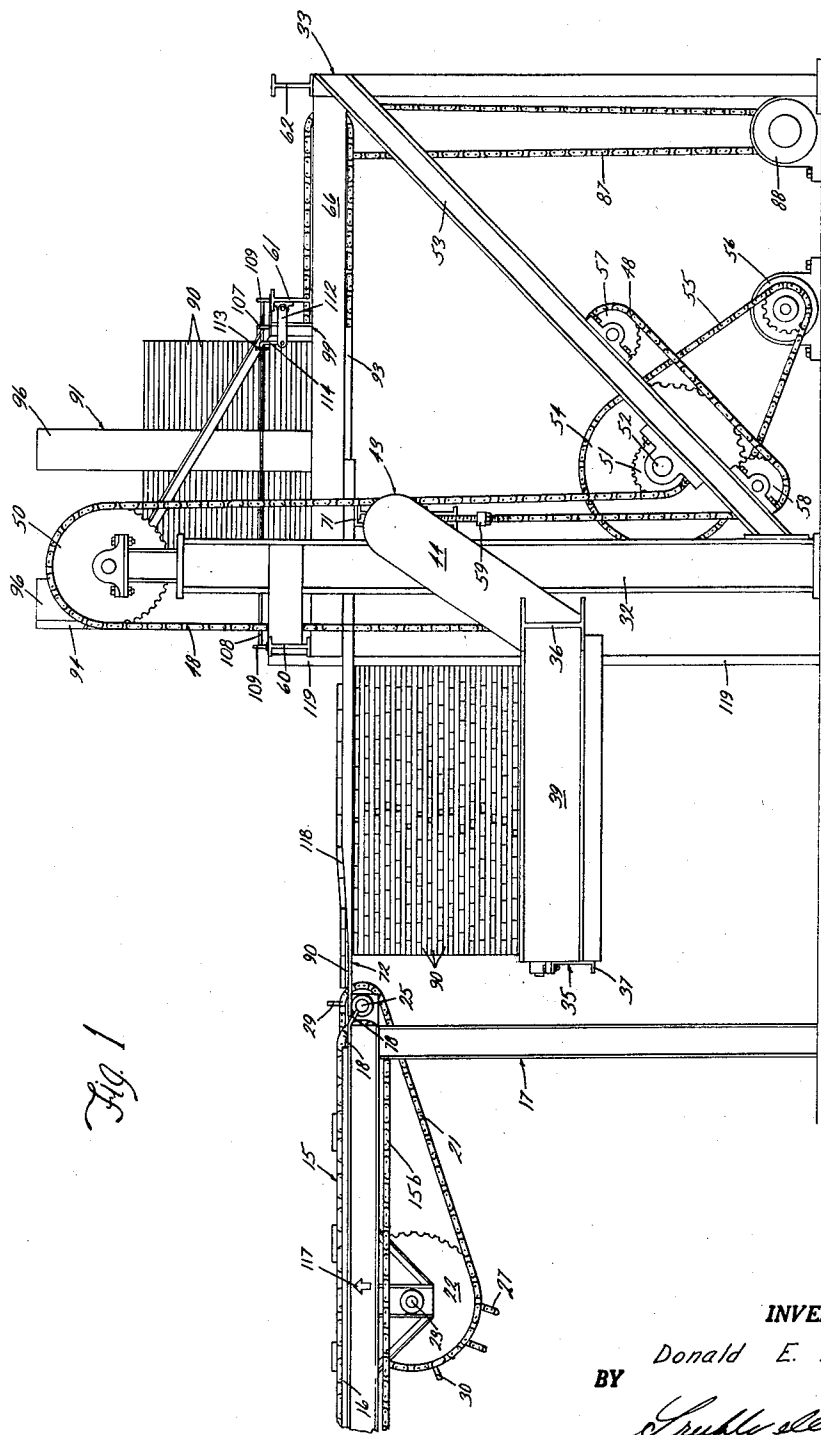


Fig. 1

INVENTOR.
Donald E. Mosely
BY
Donald E. Mosely
att.

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7 Sheets-Sheet 2

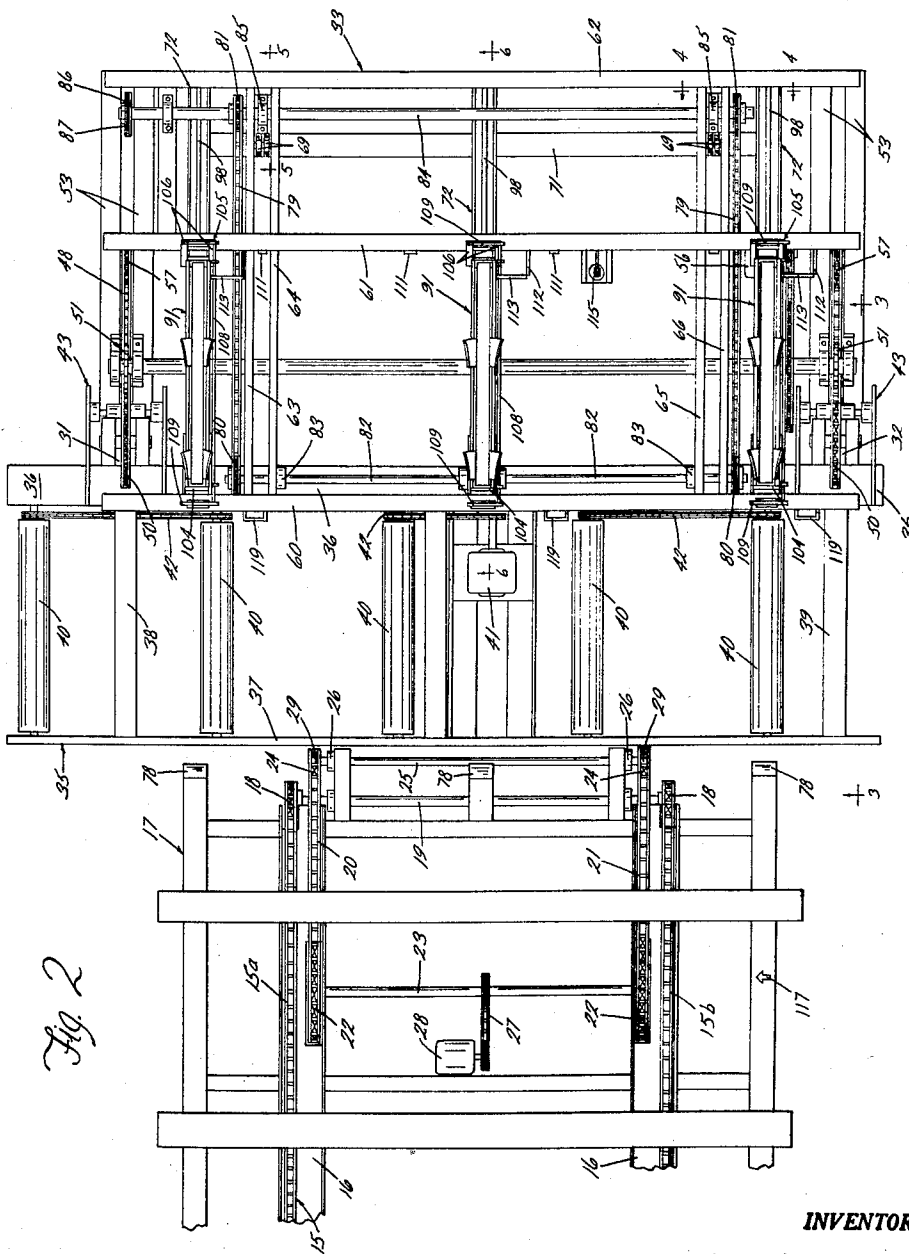


Fig. 2

INVENTOR.

BY Donald E. Mosely

Donald E. Mosely

March 15, 1960

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Fig. 3

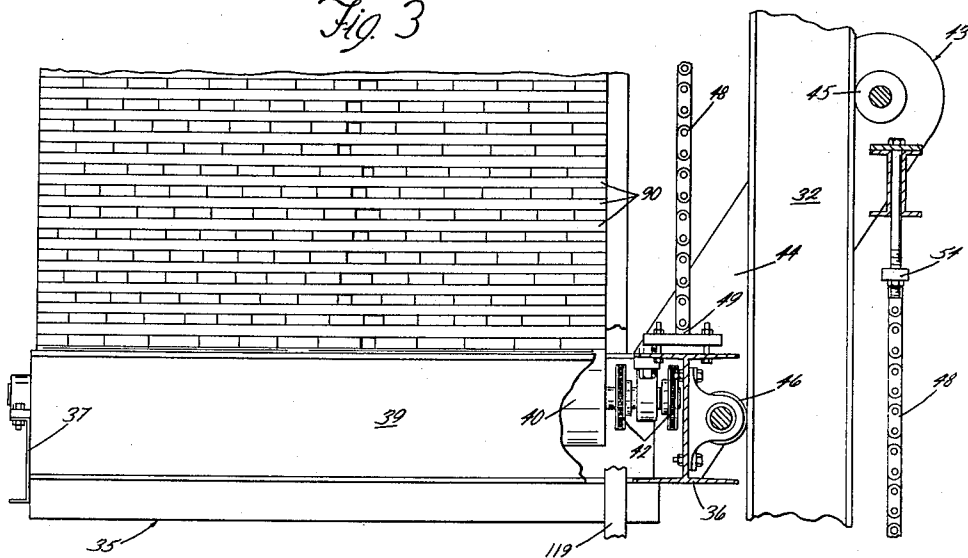
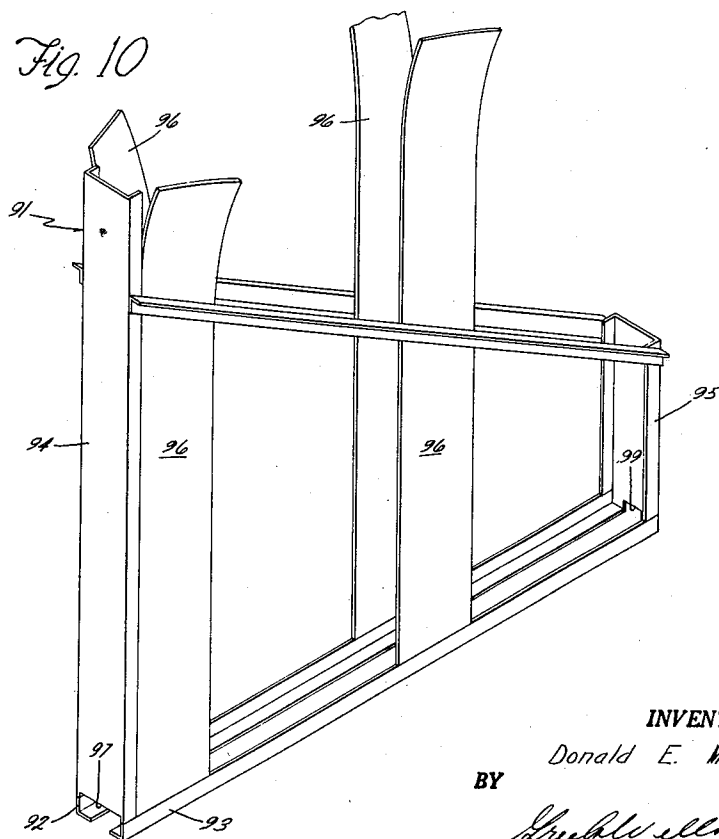


Fig. 10



INVENTOR.

Donald E. Mosely

BY

Donald E. Mosely
atty

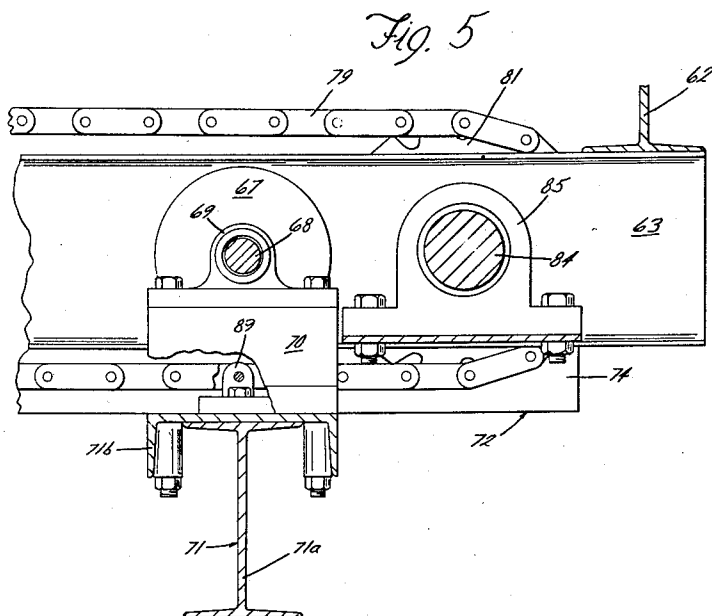
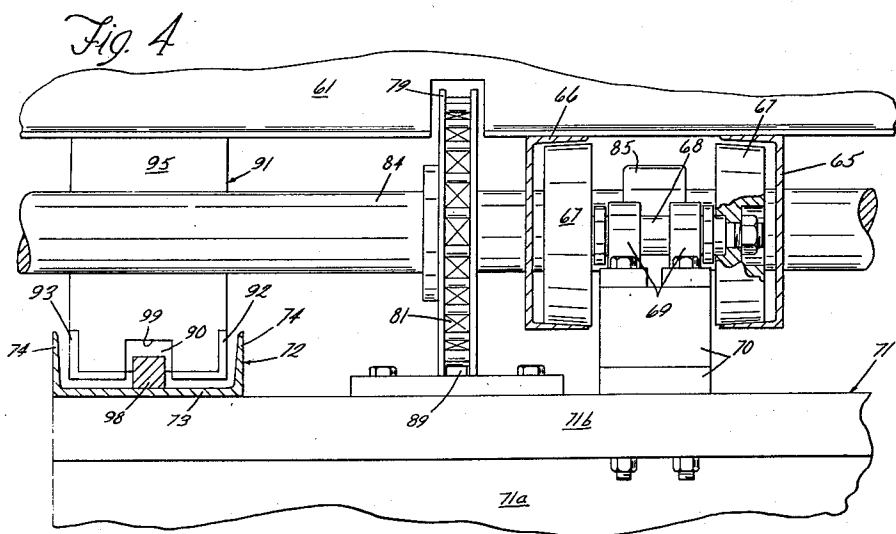
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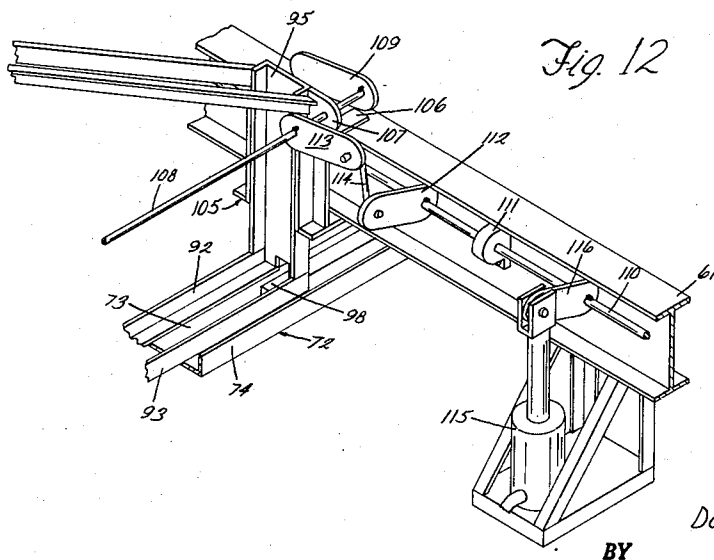
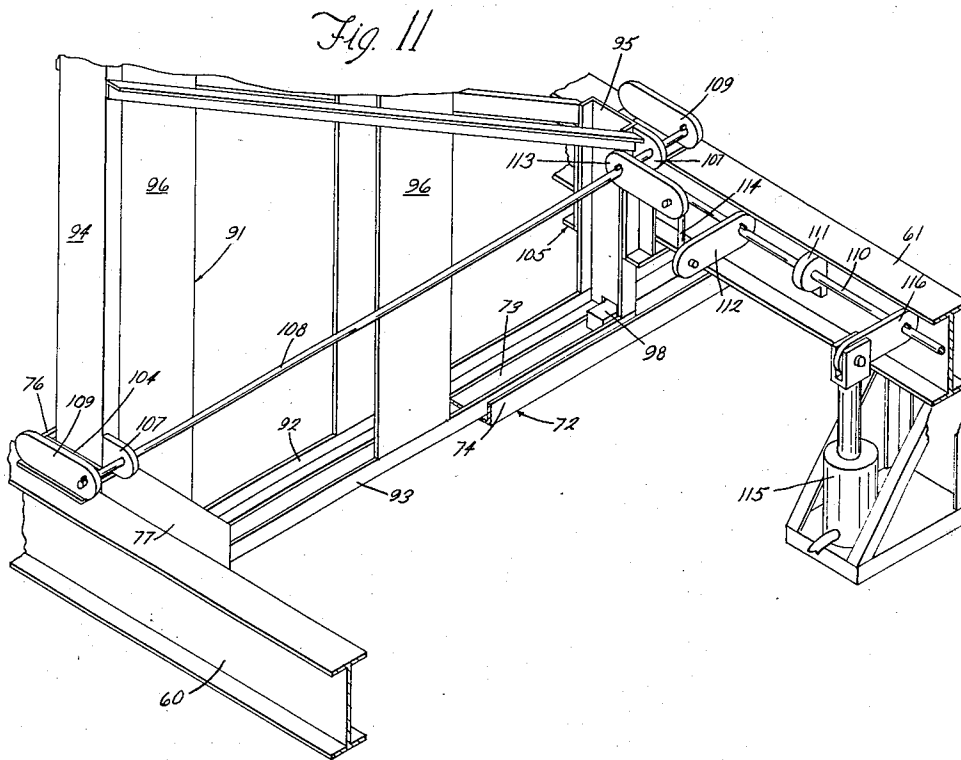
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D. E. MOSELY
LUMBER STACKER

2,928,559

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7 Sheets-Sheet 6



INVENTOR.
Donald E. Mosely
BY *Chuck Wells*
att'y.

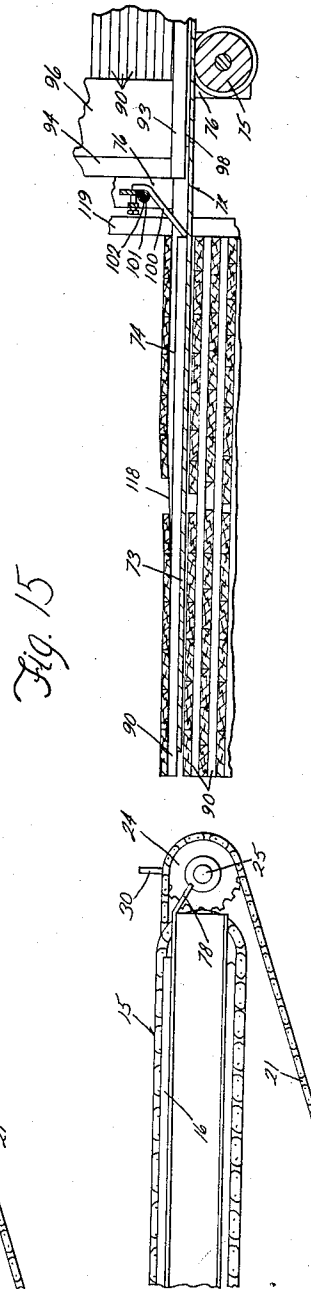
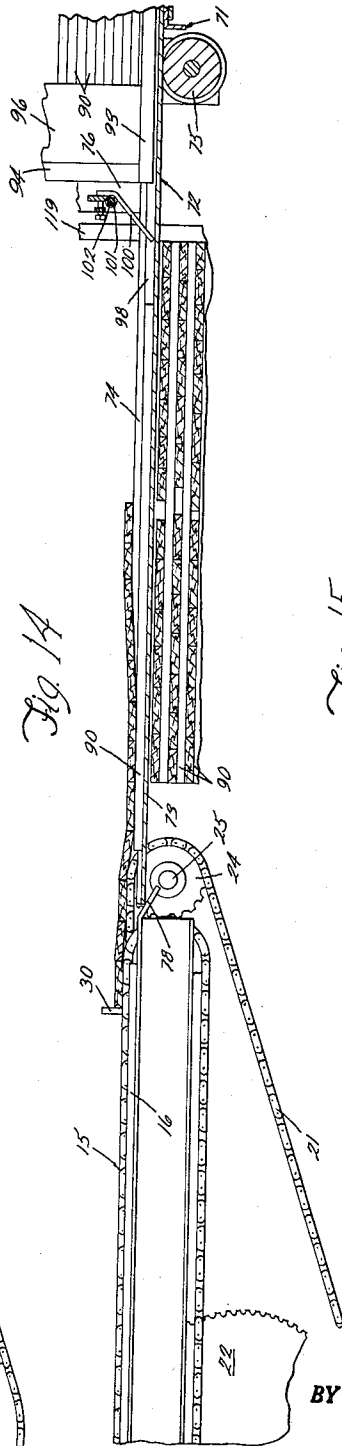
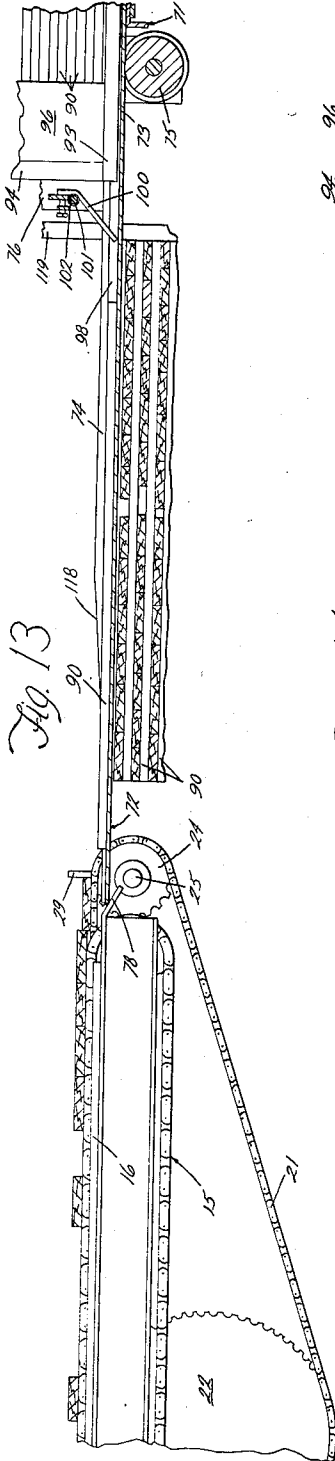
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D. E. MOSELY
LUMBER STACKER

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7 Sheets-Sheet 7



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2,928,559

LUMBER STACKER

Donald E. Mosely, Spokane, Wash., assignor to Bitco Inc.,
Spokane, Wash., a corporation of Idaho

Application February 25, 1957, Serial No. 642,022

10 Claims. (Cl. 214—6)

The present invention relates to improvements in means for stacking lumber, and more particularly to improvements in means for inserting spacing sticks between successive layers of green lumber being stacked for drying.

In production of lumber from timber, one of the steps to be carried out is that of drying the lumber. This is accomplished either by kiln drying the green lumber, or by air drying it. In either event, the commonly followed practice is to stack the lumber in well ventilated stacks for easy handling during the drying procedure. Ventilated stacks of lumber are formed by inserting between each tier or layer of boards, a number of small spacing sticks which hold the layers apart and provide ventilating passages through the stack, thereby exposing both the upper and lower surfaces of the boards of the stack to the drying air.

It is to the provision means for forming these ventilated stacks of lumber that this invention is directed. It is the principal purpose of the invention to provide means for receiving boards from a source of supply, gathering them together in layers, and depositing the layers on the stack being formed, and means to insert beneath each layer as it is stacked, a plurality of spacing sticks to hold the layer spaced above the layer below.

A further purpose of the invention is to provide means for inserting spacing sticks beneath each successive layer of boards in such a way as to avoid the possibility of breaking the sticks while they and the layer of boards thereon are being placed upon the stack.

Still another purpose of the invention is to provide such a stacking device which will so spread the boards of each layer during placement thereof as to construct a stack having uniform width throughout, regardless of the varying dimensions of the boards therein.

The nature and advantages of my invention will appear more clearly from the following description and the accompanying drawings, wherein a preferred form of the invention is shown. It should be understood, however, that the description and drawings are illustrative only, and are not intended to limit the invention, except insofar as it is limited by the claims.

In the drawings:

Figure 1 is an elevational view of the delivery end of a lumber transporting chain, showing my invention in place to receive boards from the chain and form them into a drying stack.

Figure 2 is a plan view of the mechanism illustrated in Figure 1;

Figure 3 is an enlarged fragmentary sectional view taken substantially on the line 3—3 of Figure 2, and illustrating the mounting of the stack carrying platform;

Figure 4 is an enlarged fragmentary sectional view taken substantially on the line 4—4 of Figure 2;

Figure 5 is an enlarged fragmentary sectional view taken on the line 5—5 of Figure 2;

Figure 6 is an enlarged fragmentary sectional view taken on the line 6—6 of Figure 2;

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Figure 7 is an enlarged fragmentary sectional view taken on the line 7—7 of Figure 6;

Figure 8 is an enlarged fragmentary sectional view taken on the line 8—8 of Figure 6;

Figure 9 is an enlarged fragmentary sectional view taken on the line 9—9 of Figure 6;

Figure 10 is a perspective view of one of the spacing stick racks;

Figure 11 is a fragmentary perspective view illustrating the means for supporting the racks;

Figure 12 is a fragmentary view showing part of the mechanism shown in Figure 11, but in an adjusted position; and

Figures 13, 14, and 15 are somewhat diagrammatic views illustrating the operation of the stick placing means.

Referring now to the drawings, and to Figures 1 and 2 in particular, my invention is shown as placed at the delivery end of a lumber transporting chain conveyor generally indicated at 15. The conveyor 15 may be of any suitable type, and may be part of a lumber stack break down system, or merely a "green chain" upon which green lumber is transported from the mill. As shown, the conveyor 15 comprises two spaced apart chains 15a and 15b which run in channels 16 upon a framework 17. At the delivery end of the conveyor 15, the chains 15a and 15b travel around sprockets 18 mounted on a shaft 19 journaled at the end of the framework 17. The lumber transported by the conveyor 15 is placed thereon with its longest dimension transverse to the direction of travel, as shown in Figures 1 and 2, and is moved by frictional engagement with the chains 15a and 15b.

It is the purpose of this invention to receive the lumber at the delivery end of the conveyor 15, form it into layers, and stack the layers into a ventilated drying stack. In order to form the boards into layers to be stacked, I provide at the end of the conveyor 15, a pair of lugged chains 20 and 21 extending parallel to and between the chains 15a and 15b, as best shown in Figure 2. The lugged chains 20 and 21 are trained around drive sprockets 22 mounted on a shaft 23 journaled in the framework 17, and around idler sprockets 24 mounted on a shaft 25 journaled in bearings 26 which extend outwardly a short distance beyond the end of the conveyor 15. The lugged chains 20 and 21 are driven by a drive chain 27 which is trained around a sprocket mounted on the shaft 23 as shown in Figure 2. The drive chain 27 is driven by a motor 28.

As shown in Figures 1, 13, 14, and 15 the lugged chains 20 and 21 are positioned slightly below the top flights of the chains 15a and 15b so that boards transported by these chains are not engaged with the lugged chains 20 and 21. The lug chains, however, each carry two upstanding lugs 29 and 30 which are spaced apart equidistantly on the chains 20 and 21. As shown in the drawings, the chains 20 and 21 are positioned so that one of the lugs 29 and 30 on each chain 20 and 21 is positioned directly above the idler sprocket 24. In this position, the lugs will provide a stop at the end of the conveyor 15 against which the boards thereon will pile up. The other lug 29 or 30 will be positioned below the level of the conveyor 15 as shown in Figure 1 so that it does not interfere with progress of the boards. With this construction, the boards travelling on the conveyor 15 are gathered at the delivery end to form a layer which may be transferred onto the stack to be formed therefrom. The means for effecting the transfer will be described later herein.

A short distance beyond the end of the framework 17, I provide a stacker frame which comprises a pair of transversely spaced vertical I-beams 31 and 32 and a horizontal table like frame 33 extending rearwardly

therefrom. Supporting legs 34 support the rear portion of the horizontal frame 33. Between the I-beams 31 and 32 and the conveyor frame 17, a stack supporting platform 35 is provided. As best illustrated in Figures 1, 2 and 3, the platform 35 is composed of two spaced apart transversely extending beams 36 and 37 which are tied together near their ends by cross beams 38 and 39. A plurality of load bearing rollers 40 are mounted between the beams 36 and 37. A motor 41 is also mounted on the platform 35 below the level of the rollers 40 and is drivingly connected to the rollers 40 through drive chains 42. The purpose of this construction is to provide means for moving a completed stack away from the stacking means to prepare the device for building a new stack. When a stack is completed, the motor 41 is energized, and the rollers 40 shift it from the platform 35.

The platform 35 is mounted for vertical movement, for the purpose of maintaining a constant level for the top of the stack being formed thereon, as the stack grows. As best illustrated in Figures 2 and 3, the rear transverse frame member 36 of the platform 35 is considerably heavier than the front beam 37. Connected to this rear frame member adjacent of the uprights 31 and 32 are two mounting arms 43 by which the platform 35 is mounted to the uprights 31 and 32 for vertical movement thereon. Each mounting arm 43, as shown best in Figure 3, comprises two spaced apart plates 44 secured to the rear beam 36 of the platform 35 and extending upwardly and rearwardly on each side of the adjacent upright 31 or 32. A roller 45 is journaled between the free ends of the plates 44 and bears against the upright 31 or 32. A second roller 46, mounted in bearings 47 secured to the beam 36 between the plates 44, bears against the opposite face of the upright 31 or 32. It will be readily seen that this construction mounts the platform to the uprights 31 and 32 for vertical movement thereon.

In order to move the platform 35 up and down on the uprights 31 and 32, and to provide for supporting it in any desired position, a pair of hoisting and lowering chains 48 are provided. As best shown in Figures 1 and 3, one end of each chain 48 is secured to the rear platform beam 36 as shown at 49 in Figure 3, and the chains 48 extend upwardly therefrom around idler sprockets 50 mounted atop the uprights 31 and 32. From the idler sprockets 50, the chains 48 extend downwardly and beneath drive sprockets 51 mounted on a shaft 52 which is journaled on diagonal braces 53 which form part of the support for the framework 33. The shaft 52 has a large sprocket 54 thereon which receives a drive chain 55 that is connected to a reversible motor 56. The hoisting and lowering chains 48 extend from the sprockets 51 around idlers 57 and 58 shown in Figure 1, and thence upwardly to the platform carrying arms 43 where they are secured as shown at 59 in Figure 3. With this construction, movement of the platform 35 is controlled by the motor 56 through the chains 48. Braking means (not shown) are provided with the motor 56 to hold the platform in any adjusted position.

In order to transfer a layer of boards from the conveyor 15 to the platform 35, and to insert spacing sticks, or "stickers" as they are known in the industry, beneath the successive layers, a unique mechanism is utilized and will now be described.

The horizontal frame 33 is comprised of three spaced apart transverse beams 60, 61 and 62, which are joined together by four longitudinally extending channel irons, mounted in pairs near the opposite ends of the beams 60-62. The pair of channel irons near the left ends of the beams 60-62 are indicated by numerals 63 and 64. The pair at the opposite ends of the beams 60-62 are indicated by numerals 65 and 66. Each pair of said channel irons is arranged so that the flanges of the channel irons of each pair face each other, as shown in Figure 4. The channel irons 63 and 64 and the channel irons 65 and 66 form two sets of rails, each adapted to receive a pair of rollers 67 as shown in Figures 4 and 5. The rollers

67 of each set ride between the flanges of the channel irons 63-66 and are connected by a short axle 68. The axles 68 are mounted in bearing 69 which are in turn fixed to blocks 70 mounted upon a transverse T-beam 71. The beam 71 is, as shown in Figure 5, composed of an I-beam 71a and a channel 71b. With this construction, the T-beam 71 is mounted for free movement toward and away from the delivery end of the conveyor 15. The T-beam 71 has fixed thereto three transversely spaced and longitudinally extending sticker carrying arms. The arms 72 are composed of inverted channel irons having bottom webs 73 and upstanding flanges 74. The sticker carrying arms 72 extends forwardly from the beam 71 as illustrated in Figure 6 and are supported near their front ends upon spool shaped rollers 75 which, as shown in Figures 6 and 7, are journaled between spaced apart plates 76 and 77 that depend from the forwardmost transverse beam 60 of the frame 33. The sticker carrying arms 72 ride upon the rollers 75 and between the plates 76 and 77. Thus, if the T-beam 71 is moved forward, the sticker carrying arms 72 will be extended over the platform 35. The arms 72 are of such a length that when fully extended (the length of their travel being limited by engagement of the beam 71 with the rollers 75) they will span the space between the conveyor 15 and the framework 33 as shown in Figure 1. During their extension, the arms 72 are supported solely by the beam 71 and its rollers 67 and by the spool rollers 75. Upon reaching the framework 17 of the conveyor 15, however, the forward ends of the arms 72 engage with and ride upon short inclined ramps 78 which are fixed on the framework 17. Thus, when fully extended, the arms 72 are supported at both ends.

To move the beam 71 and arms 72, in the manner just described, I provide a pair of driving chains 79 trained around front and rear sprockets 80 and 81 which are positioned adjacent the channel members 63 and 66. The front sprockets 80 are mounted on shafts 82 journaled in bearings 83 which are mounted to the frame 33. The rear sprockets 81 are mounted on a shaft 84 which is journaled in bearings 85 mounted on the frame 33. The shaft 84 has a drive sprocket 86 at one end which engages with a driven chain 87 connected to a reversible motor 88. The chains 79 are each fixed to the beam 71 by brackets 89, as shown in Figures 4 and 5, so that when the motor 88 is energized to drive the chains 79 in one direction, the beam 71 and the arms 72 will be moved forwardly over the platform 35, and when the motor 88 is energized in the other direction, the beam 71 and arms 72 will be withdrawn under the frame 33.

The function of the arms 72 is to receive stickers such as indicated at 90 from a source of supply, carry them out over the platform 35 where a layer of boards can be deposited thereon as hereinafter described, and then deposit them and their load, on the platform 35. In order to supply stickers to the arms 72, I provide three sticker carrying racks 91 which are mounted on the frame 33 directly above the arms 72. As best illustrated in Figure 10, each of the racks 91 comprises two spaced apart, longitudinal angle irons 92 and 93 which are connected at their ends to front and rear vertical channel members 94 and 95. Vertical side posts 96 are also provided to keep the stickers confined in place. The stickers 90 are stacked in the racks 91 as illustrated in the drawings, with the bottommost sticker 90 resting upon the members 92 and 93. An aperture 97 is provided in the front wall 94 of the rack 91 through which the stickers 90 may be withdrawn one at a time.

As best illustrated in Figures 6 and 8, the racks 91 are normally held, by means which will be described hereinafter, in such a position that the bottom angle irons 92 and 93 are positioned slightly above the bottom webs 73 of the carrying arms 72, and between the upstanding flanges 74 thereon. Thus, the bottom sticker 90 in each rack 91 is positioned within the arm 72. In order to withdraw stickers 90 from the racks 91 to carry them out

over the platform 35, each arm 72 has mounted therein, an elongated, upstanding lug 98 which is secured to the bottom web 73. The lug 98 is in width, a dimension slightly less than the distance between the angle irons 92 and 93 of the racks 91, and extends high enough from the web 73 to engage the bottommost sticker 90 in the rack 91 when the rack 91 is in operative position. As indicated at 99 in the drawings, a notch is provided in the rear wall 95 of each rack 91 to allow the lug 98 to enter.

The lugs 98 are positioned in the rear portions of the arms 72 so that when the arms 72 are retracted beneath the frame 33, the front edges of the lugs 98 are behind the sticker racks 91. As the arms 72 are moved forward by operation of the motor 88, the lugs 98 pass through the apertures 99 in the rear walls 95 of the racks 91 between the angle irons 92 and 93 thereof, and engage the bottom most sticker 90 in each rack. Continued forward movement of the arms 72 causes the stickers 90 so engaged to be slid through the front dispensing apertures 97 and dropped onto the arms 72. In this manner, the arms 72 receive stickers 90 each time they move forwardly.

To provide for depositing the stickers 90 upon the platform 35 when the arms 72 are retracted, a dog or pawl 100 is provided as illustrated in Figures 6, 7 and 9, above each arm 72. The pawls 100 are fixed to sleeves 101 which are rotatably mounted on shafts 102 secured between the plates 76 and 77 which mount the spool rollers 75. As shown in the drawings, the pawls 100 are so arranged as to ride over the stickers 90 as they are carried out by the arms 72, and then drop behind the stickers when they have passed. To permit the pawls to drop behind the stickers 90, they are bifurcated as shown at 103 so as to fall on either side of the lugs 98. When the pawls 100 fall behind the stickers 90, they prevent the stickers from returning with the arms 72, and cause them to be deposited on the platform 35.

In building stacks on the platform 35 from lumber transported on the conveyor 15, it is often desirable to insert stickers 90 only occasionally, and sometimes not at all. This is accomplished by the present invention by mounting the racks 91 in such a manner that they may be supported above the racks 91 for vertical movement so as to be positioned either in operative position as hereinbefore described, or raised an inch or so above that position so that the lugs 98 in the arms 72 do not extract stickers as they move thereunder. The mechanism for accomplishing this will next be described.

As illustrated in the drawings, the racks 91 are slidably received in vertical rack guides 104 and 105 which are mounted in the frame 33. The front rack guides 104 are mounted between the plates 76 and 77 which carry the roller 75. The rear guides 105 are mounted by braces 106 that extend forwardly from the transverse beam 61. Back of the racks 91 is provided with a pair of shaft supporting ears 107 in which a shaft 108 is journaled, as shown in Figures 11 and 12. The shafts 108 extend a short distance beyond the racks 91 at each end and have lifting lugs 109 keyed thereto at the ends. The lugs 109 are positioned above and rest upon the transverse beams 60 and 61 to support the racks 91 in the guides 104 and 105. When the lugs are allowed to lay flat, as shown in Figure 11, they support the racks 91 in operative position for dispensing stickers 90. However, if the shafts 108 are rotated a few degrees in a direction to pivot the lugs 109 downwardly, the racks 91 will be lifted, as is illustrated in Figure 12 to an inoperative position above the arms 72. To accomplish this rotation of the shafts 108, and to lift all of the racks 91 in unison, I provide a lifting shaft 110 which extends adjacent to and parallel to the transverse beam 61 and which is journaled in bearings 111 fixed to the beam 61. The shaft 110 has levers 112 fixed thereto adjacent each of the racks 91. The shafts 108 on the racks 91 have levers 113 fixed thereon which are connected through links 114 to the levers 113 so that rotation of the shaft

110 in its bearings 111 will effect vertical adjustment of the racks 91. The shaft 110 is rotated by operation of a hydraulic cylinder 115 which is connected to an actuating arm 116 fixed on the shaft 110 as shown in Figures 11 and 12.

With the construction just described, it is possible to raise and lower the sticker racks 91 at will during operation of the machine. If the racks 91 are maintained in raised position, then no stickers will be fed, and the layers of boards will be moved onto the arms 72 and thence stacked on the platform 35 without stickers 90. If the racks 91 are lowered, stickers will be inserted in the stack between each course or layer of boards. It can be seen that by timed manipulation of the cylinder 115, the operator can build a stack with stickers between every course of board, or between every other course, or in any combination desired.

The operation of the device to form boards transported by the "green chain" conveyor 15 into a ventilated drying stack is as follows: First, a base layer of boards is laid on the platform 35, or if desired, a pallet may be laid thereon to receive the stack to be formed. When this has been done, the motor 88 is operated to extend the arms 72 until they engage the ramps 78 as shown in Figures 1 and 11. As the arms 72 are extended, each withdraws a sticker 90 from a rack 91 and carries it out as hereinbefore described. When the arms 72 are fully extended, the stickers 90 will be positioned above the platform 35, and the pawls 100 will have dropped behind them as shown in Figure 13. The platform 35 will then be raised, by operation of the motor 56, until the base layer or pallet thereon is positioned immediately below the arms 72. The lugged chains 20 and 21 will be adjusted to bring the lugs 29 of each into position directly above the idler sprockets 24. The several elements are then allowed to remain at rest while boards on the conveyor 15 are allowed to pile up against the lugs 29. The boards are allowed to pile up until the layer extends back to an indicating mark 117 painted on the frame 17. When enough boards have piled up to form a layer for the stack to be formed, the operator energizes the motor 28 to drive the lugged chains 20 and 21 forward. This action carries the lugs 29 around the idlers 24 and out of position to stop the boards, and carries the lugs 30 up behind the layer of boards as shown in Figure 12 to push the layer onto the stickers 90 held on the arms 72. When the lugs 30 reach the stop position originally occupied by the lugs 29, the motor 28 is stopped. As shown in Figure 1, the layer of boards will then be positioned upon the arms 72 and sticker 90. When the boards have been pushed onto the arms, 72, they are retracted to deposit the stickers 90 and the layer of boards on the platform 35. While this is occurring, a new layer of boards is being piled up behind the lugs 30 on the chains 29 and 21. As soon as the arms 72 have retracted, the platform 35 is dropped a few inches to give clearance, and the arms 72 are again extended, carrying new stickers 90 from the racks 91. The platform 35 is then readjusted to bring the top of the previously deposited layer of boards immediately below the arms 72, and the process of moving the next layer of boards onto the arms 72 is begun.

In most instances, the boards delivered by the conveyor 15 will not be sorted or sized, so the layers will not be of uniform width. Even so, it is desirable to construct the ventilated stack so that its side edges are substantially uniform. To accomplish this, the boards must be placed upon the stack so that the outside boards of each layer are a uniform distance apart. To provide for placing the boards on the stack in this manner, I construct the sticker carrying arms 72 so that the side flanges 74 thereof are tapered downwardly near the front end as illustrated at 118. At the front end of each arm 72, the flanges 74 are of a height substantially less than the thickness of the stickers 90, so that the

stickers 90 protrude thereabove. A short distance back, the flanges 74 taper upwardly as shown at 118 to a height greater than the thickness of the stickers 90. With this construction those boards near the front of the arms 72 rest upon the stickers 90, while those near the opposite end of the layer rest upon the flanges 74 of the arms 72. When the arms 72 are retracted to deposit the stickers 90 on the platform 35, those boards resting upon the stickers 90 will be stopped when the stickers 90 are stopped by the pawls 100. The boards resting on the flanges 74, however, will continue to move with the arms 72 until they engage stop bars 119 which are provided at the front of the platform 33 to define the rear load line of the stack on the platform 35. As shown in Figure 12, these stop bars 119 are aligned with the pawls 100 so that the boards carried back by the arms 72 are stopped in proper alignment with the rear of the stickers 90, to make a clean stack. With this construction, both the front and rear sides of the stack are made uniform, and any spacing in the layer of boards is left at the center of the layer.

The process of moving successive layers of boards onto the platform 35 and placing spacing stickers 90 therebeneath is continued as above described until the stack attains the desired height. When the desired number of layers have been placed thereon, the device is stopped and the platform 35 is lowered to ground level. The motor 41 is then energized to drive the rollers 40 to move the stack from the platform 35, and the process is repeated.

While I have described the operation of my invention as though each element thereof was manually controlled, it is obvious that provision for automatic or semi-automatic operation may be made. For example, by the provision of suitable switches and time delay mechanism, the whole operation of the device may be made automatic, depending only upon the presence of a single operator to watch the formation of each layer of boards behind the stop lugs 29 and 30 and trip a starting switch for the motor 28 when a complete layer of boards is formed. Switch means may be provided to automatically stop the motor 28 when the chains 20 and 21 have driven far enough to move the layer onto the waiting arms 72 and bring the next lug 29 or 30 into stopping position. Additional switch means may be provided to automatically retract the arms 72, drop the platform 35, bring the arms 72 back, and readjust the platform 35 upon operation of the chains 20 and 21. The provision of such automatic control means is well within the purview of the skilled electrical engineer.

It is believed evident from the foregoing that my invention provides a simple and efficient device for forming ventilated lumber stacks. The mechanism operates in such a manner as to form a clean stack regardless of non-uniformity of board widths, and due to the unique manner of placing the stickers 90, the difficulties arising from defective stickers are considerably reduced. It has been found that uneven stickers and even split or cracked stickers can be effectively used with my device without difficulty.

It is believed that the nature and advantages of my invention appear clearly from the foregoing description. Having thus described my invention, I claim:

1. Lumber stacking means comprising, in combination with a board transporting conveyor having a delivery end, a framework mounted adjacent the delivery end of said conveyor, vertically movable stack supporting means positioned between said framework and the conveyor, means to raise and lower said vertically movable means, a plurality of spacing stick carrying arms mounted to said framework for movement toward and away from the conveyor, means to move said arms toward the conveyor over the vertically movable stack supporting means and away from said conveyor and said stack supporting means, spacing stick supply means mounted on said

framework, means operatively connected with said arms to remove spacing sticks from said supply means and deposit them on said arms as the arms are moved toward the conveyor, means to transfer boards from the conveyor onto the sticks while the sticks are supported on said arms and while the arms are extended over the stack supporting means, and means to discharge said sticks and boards thereon onto the stack supporting means as the arms are moved away from the conveyor.

2. Lumber stacking means comprising, in combination with a board transporting conveyor having a delivery end, a framework mounted adjacent the delivery end of said conveyor, vertically movable stack supporting means positioned between said framework and the conveyor, means to raise and lower said vertically movable means, a plurality of spacing stick carrying arms mounted to said framework for movement toward and away from the conveyor, means to move said arms toward the conveyor over the vertically movable stack supporting means and away from said conveyor and said stack supporting means, spacing stick holding racks mounted on said framework above said arms, spacing sticks supported in said racks, each of said racks having a slot in the bottom thereof extending parallel to the arm thereunder, lug means on said arms operable to pass through said slots when the arms are moved forwardly and engage a spacing stick in each rack and remove it from said rack onto the arm whereby to carry said stick over the stack supporting means, means to collect boards on said conveyor into layers and transfer said layers onto the sticks while the arms are extended over the stack supporting means, and means to prevent said sticks from moving away from said stack supporting means as the arms are moved away, whereby to deposit said sticks and boards thereon on said stack supporting means.

3. Lumber stacking means comprising, in combination with a board transporting conveyor having a delivery end, a framework mounted adjacent the delivery end of said conveyor, a stack supporting platform positioned between said conveyor and said framework, means to raise and lower said platform, a plurality of spacing stick carrying arms mounted to said frame for movement toward and away from the conveyor, means to move said arms over the platform toward the conveyor and away from the conveyor and the platform, ramp means mounted adjacent the delivery end of the conveyor and operable to engage and support the arms when they are moved toward the conveyor, stick holding racks mounted on the framework above the arms, means operatively connected with said arms to remove spacing sticks from said racks and deposit them on the arms as the arms are moved toward the conveyor, layer forming and transferring means mounted adjacent the delivery end of the conveyor operable to gather boards on the conveyor into layers and transfer the layers onto the sticks carried by said arms when the arms are engaged with said ramps, and means to engage said sticks and prevent them from moving with the arms as the arms are moved away from the conveyor whereby to deposit the sticks and boards thereon onto the platform.

4. Lumber stacking means comprising, in combination with a board transporting conveyor, a stack receiving platform mounted at the delivery end of said conveyor, means to raise and lower said platform, a framework adjacent said platform, spacing stick carrying means mounted in said framework for movement toward and away from said conveyor, means to move said spacing stick carrying means toward the conveyor over the platform, and to withdraw said spacing stick carrying means away from said conveyor and from over the platform, spacing stick dispensing means mounted in said framework, means to remove spacing sticks from the dispensing means and deposit them on the spacing stick carrying means, whereby to be carried over the platform, board transferring means mounted adjacent the delivery end of

the conveyor and operable to gather boards on the conveyor into layers and transfer the layers onto the spacing sticks carried on said carrying means when said carrying means is extended over the platform, and means to engage the spacing sticks and prevent them from moving with the carrying means when said means is withdrawn from over the platform whereby to deposit said sticks and the boards thereon on the platform.

5. Lumber stack forming means comprising the combination with a board transporting conveyor of a stack receiving platform mounted at the delivery end of the conveyor, a plurality of horizontal arms supported adjacent said platform and substantially level with the board transporting conveyor, means to move said arms horizontally over the platform toward and into close juxtaposition with the conveyor and to move the arms away from the conveyor and from over the platform, sticker dispensing means mounted adjacent the platform, said arm moving means operable to move the arms beneath said dispensing means when they are moved away from the conveyor, means to remove spacing sticks from said dispensing means and deposit them on said arms, stop means positioned at the end of said conveyor operable to engage boards on the conveyor and hold them against discharge therefrom whereby to gather a layer of boards at the delivery end of the conveyor, means to lower said stop means to permit said layer of boards to be discharged onto the sticks carried by said arms when the arms are moved into juxtaposition with the conveyor, and means to prevent said sticks from moving with the arms when they are moved away from the conveyor whereby to deposit the sticks and the boards thereon on the platform as the arms are moved over the platform.

6. Lumber stacking means comprising in combination with a board transporting conveyor having a delivery end, a framework mounted adjacent the delivery end of said conveyor, vertically movable stack supporting means positioned between said frame and the conveyor, means to raise and lower said vertically movable means, a plurality of spacing stick carrying arms mounted to said framework for movement toward and away from the conveyor, means to move said arms toward the conveyor over the vertically movable stack supporting means and away from said conveyor and said stack supporting means, said arms being U-shaped in cross section having horizontal web portions and spaced apart upstanding flanges thereon, spacing stick supply racks mounted in the framework, said arms moving beneath said racks when they are moved away from the conveyor, said racks having dispensing openings therein adjacent the bottoms thereof, and having slots in the bottoms thereof, said arms having lug means mounted between the flanges and operable to enter said slots in the racks and engage spacing sticks on said racks and remove said sticks through the dispensing openings when the arms are moved toward the conveyor whereby to deposit said sticks on the arms between the flanges and carry them over the stack supporting means, means to gather boards on said conveyor into layers of boards and to transfer said layers onto the arms over the spacing sticks, and pawl means on the frame over the arms operable to drop behind the spacing sticks carried by the arms when the arms are moved over the stack supporting means whereby to prevent the sticks from moving with the arms as the arms are moved away from the conveyor and deposit said sticks and the boards thereon on the stack supporting means.

7. Lumber stacking means comprising, in combination with a board transporting conveyor, a stack receiving platform mounted at the delivery end of said conveyor, means to raise and lower said platform, a framework adjacent said platform, spacing stick carrying means mounted in said framework for movement toward and away from said conveyor, means to move said spacing stick carrying means toward the conveyor over the platform, and to withdraw said spacing stick carrying means

away from said conveyor and from over the platform, spacing stick dispensing means mounted in said framework, means to remove the spacing sticks from the dispensing means and deposit them on the spacing stick carrying means, whereby to be carried over the platform, endless chain conveyor means mounted beside the conveyor at the delivery end thereof and below the board transporting surface thereof, first lug means on said chain conveyor means extending upwardly into the path of boards travelling on the board transporting conveyor and operable to engage and stop boards travelling on the conveyor whereby to gather a layer of boards together, second lug means on said chain conveyor means spaced from said first lug means and operable on movement of the chain conveyor means to engage behind said layer of board and move it onto the spacing sticks carried by said carrying means while the carrying means is extended over the platform, and means to engage the spacing sticks and prevent them from moving with the carrying means when said means is withdrawn from over the platform, whereby to deposit said sticks and the boards thereon on the platform.

8. In a lumber sticking device including a vertically movable stack supporting platform, a board conveyor, and means to receive layers of boards from the conveyor and deposit them on the platform, the improvement in means for gathering boards on the conveyor into layers and transferring said layers onto the receiving and depositing means, comprising an endless chain, sprockets mounting said chain at the delivery end of the conveyor, said chain having an upper flight extending parallel to said conveyor and below the load bearing surface of the conveyor, first lug means on said chain extending upwardly in the path of boards travelling on the conveyor and operable to stop said boards to form a layer of boards on the conveyor behind the lug means, second lug means on the chain spaced from the first lug means and positioned below the conveyor, and means to drive said chain whereby to move the first lug means below the conveyor and to move the second lug means up into the path of boards travelling on the conveyor behind the layer of boards formed behind the first lug to engage said layer and move it off the delivery end of the conveyor onto the layer receiving and depositing means.

9. Lumber stacking means comprising a stack receiving platform, a framework adjacent said platform, arm means mounted in said framework for movement over the platform, means to move said arm means over the platform and to withdraw said arm means from over the platform, said arm means having means thereon for supporting spacing sticks thereon whereby to carry said spacing sticks over the platform, board transferring means adjacent the platform operable to transfer boards onto said arm means over the spacing sticks supported thereon when the arm means are extended over the platform, and means on the framework preventing the spacing sticks and boards from withdrawing from over the platform when the arm means are withdrawn, whereby to deposit said sticks and said boards on the platform when the arm means are withdrawn.

10. Lumber stacking means comprising, in combination with a board transporting conveyor having a delivery end, a framework mounted adjacent the delivery end of said conveyor, vertically movable stack supporting means positioned between said frame and the conveyor, means to raise and lower said vertically movable means, a plurality of spacing stick carrying arms mounted to said framework for movement toward and away from the conveyor, means to move said arms toward the conveyor over the vertically movable stack supporting means and away from said conveyor and said stack supporting means, spacing stick supply means mounted on said framework, means operatively connected with said arms to remove spacing sticks from said supply means and deposit them on said arms as the arms are moved toward the conveyor, said arms having raised portions at the sides of the spac-

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ing sticks extending above the sticks only along about a half portion of the arm most remote from the conveyor, means at said delivery end of the conveyor operable to slide boards from the conveyor over the sticks and over the raised portions of said arms while the arms are extended over the stack supporting means, whereby part of a layer of boards next to the conveyor rests upon the sticks while other boards of the layer rest on said raised portions of the arms, stop means on the framework limiting movement of boards toward the framework, and operable to vertically align the edge of the board nearest the framework with the corresponding edge of previously

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deposited board layers on said stack supporting means when the arms are withdrawn from beneath the sticks.

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