June 19, 1928. 1,674,319

A. E. CRANSTON

METHOD AND MACHINE FOR DELIVERING BOARDS

Filed Oct. 27, 1925 2 Sheets-Sheet 1

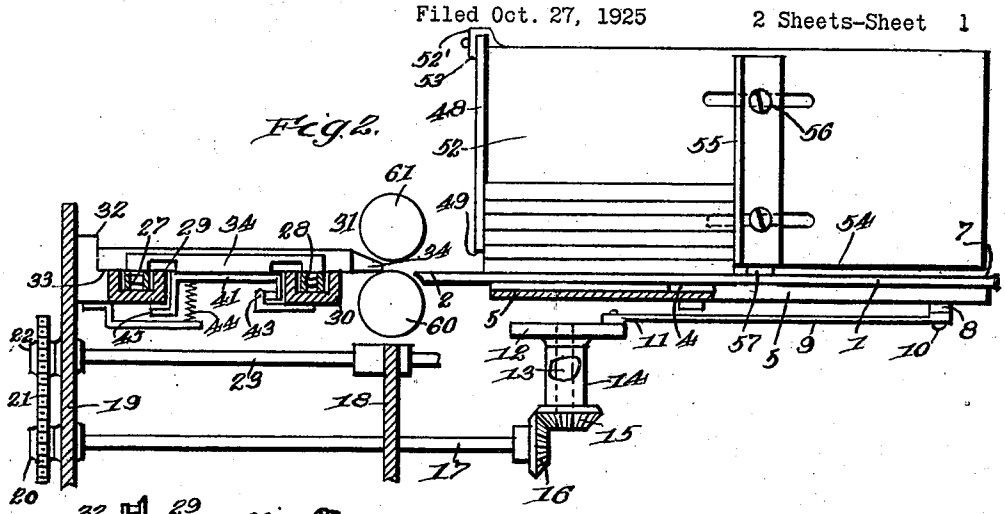

Fig. 2.

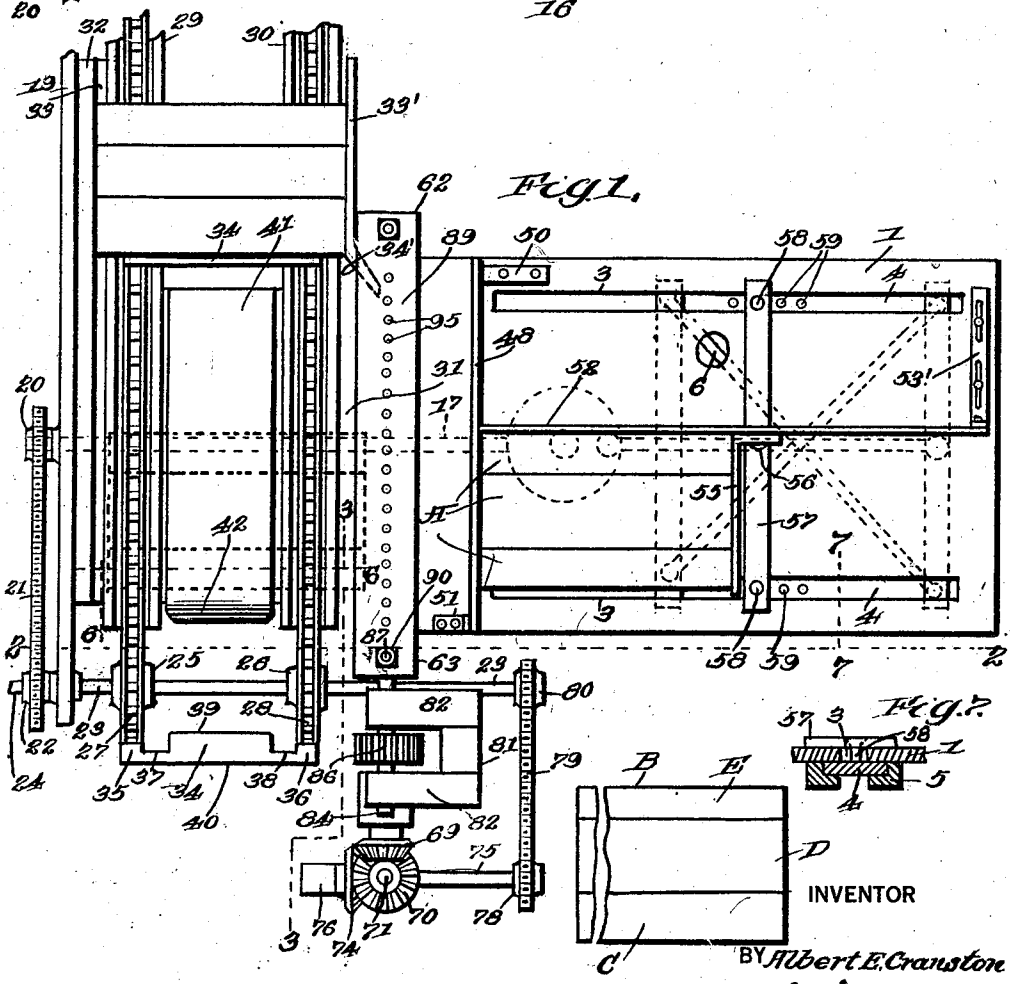

Fig. 1.

Fig. 7.

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Fig. 3.

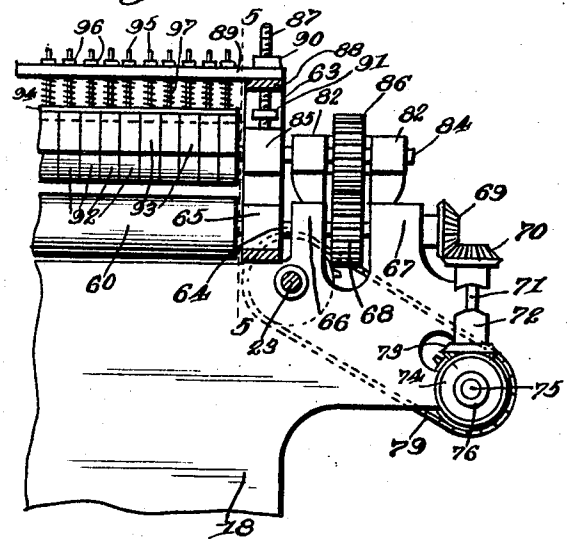


Fig. 4.

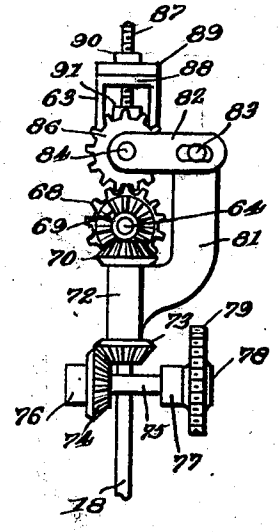


Fig. 5.

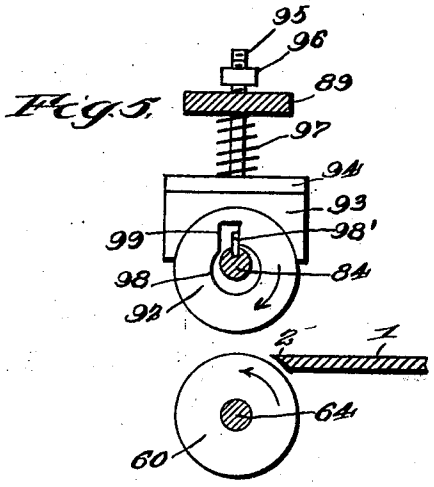
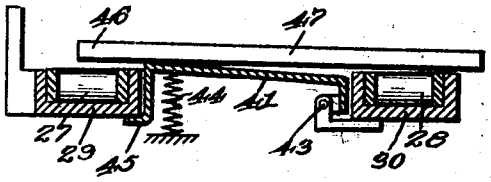


Fig. 6.



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UNITED STATES PATENT OFFICE.

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METHOD AND MACHINE FOR DELIVERING BOARDS.

Application filed October 27, 1925. Serial No. 65,256.

This invention relates to improvements in methods and in mechanism for delivering boards.

Although the device of my invention is not wholly so restricted, still, it is primarily designed to accomplish certain definite purposes and functions in connection with and preliminary to the production of a certain product which is made up from materials having characteristics requiring handling of the materials in a manner to compensate for the peculiar nature of the latter.

My invention is especially designed for handling and delivering boards preliminary to the incorporation of the latter into box ends of the multiple or composite type wherein otherwise waste lumber is employed, the boards, even for the highest type of box end, being dressed only on one side and being in any event of random thickness. Previous to being supplied to the device of my invention, the boards are all reduced to uniform length and each box end is made up of two or more boards, forming the center or body of the end, and such boards will be hereinafter described and are dealt with in the machine, as sets, and the sets of boards are retained in assembled relation throughout their passage through the machine. Specifically speaking, the sets of boards are at all times in loose or unconnected parallel relation.

Although certain operations on the sets of boards are intended to be performed while said sets are negotiating this machine, which operations are not shown or described, because they would be aggregative to this machine, still, my present invention has to do with novel means for not only maintaining predetermined segregation of the sets of boards, but also, for alining the boards of the sets while they are segregated and preliminary to subsequent and further operations thereon with which this case has nothing otherwise to do.

I will next describe one form of the device of my invention which I think is best adapted for the foregoing specialized service, and will hereinafter particularly point out in the claims the specific features of novelty thereof.

In the drawings:—

Fig. 1, is a plan view of the device of my invention.

Fig. 2, is a sectional view on line 2—2 of Fig. 1, looking toward the top of the sheet.

Fig. 3, is a sectional view on line 3—3 of Fig. 1, looking to the right of said view.

Fig. 4, is an end view looking from the right of Fig. 3.

Fig. 5, is a sectional view on line 5—5 looking toward the left of Fig. 3.

Fig. 6, is a sectional view on line 6—6 of Fig. 1 and Fig. 7 is a sectional view on the line 6—6 of Fig. 1, looking to the left of the figure.

Like characters of reference designate similar parts throughout the different figures of the drawings.

In the form shown, my invention includes a board alining table having a flat table body 1, provided with a delivery end 2 and having slots 3, therein. Below table 1, is a cross head comprising longitudinal members 4, slidable in guides 5, and connected with cross braces 6. At the rear end 7, of the table, the members 4, are connected with a bar 8, and a pitman 9, is pivoted at 10, to said bar. The remaining end 11, of said pitman is pivoted to a crank disc 12, mounted on the upper end of a shaft 13, that is journalled in a bearing 14. On the lower end of said shaft 13, is a bevel gear 15 which meshes with bevel gear 16, on a counter shaft 17, suitably journalled in supporting frame members 18 and 19. The remaining end of shaft 17, has a sprocket wheel 20, over which a chain 21 is trained, said chain being trained over sprocket wheel 22, mounted on a carrier shaft 23, which is suitably journalled in members 18 and 19. This carrier shaft may constitute the main drive shaft whereto power may be applied in any desired way at 24. Mounted on shaft 23, are carrier sprocket wheels 25 and 26, over which the intake laps of endless carrier chains 27 and 28, are trained, and which endless carrier will hereinafter be termed a carrier, when broadly referred to. I provide U-shaped guide supports 29 and 30, for the chains 27 and 28, respectively, and on that side of the carrier remote from the intake side 31, I provide a guide liner 32, the bottom 33 thereof, being preferably flush with the tops of support guides 29 and 30. This guide liner is adapted to be engaged by the ends of the boards delivered onto the carrier, as will be later described.

On the intake side of the carrier designated as the intake side, and suitably disposed beyond the feeding rolls, to be later described, is a shifting liner 33′ having a bent shifting end 34′ which is suitably reduced in size and arranged to project sufficiently between the rolls to engage the right hand ends of the boards and shift them lengthwise into endwise abutting relation with liner 32.

The carrier includes followers 34, the ends 35 and 36 of which are suitably secured to chains 27 and 28, respectively. Said followers are recessed at 37 and 38, to clear the guides 29 and 30, and the central portions of said followers are increased in heighth as indicated at 39, for a purpose which will presently appear. The normally upper edge 40, of the follower, projects sufficiently to engage the boards but is below the tops thereof, the followers being arranged to engage the boards laterally thereof.

I have provided means for lifting the foremost ends of the delivered boards to free them from interference with the guide 29 and chain 27, until after the delivered boards have been deposited onto the carrier.

As shown, said means consists of a plate 41, having a downwardly curved end 42, to escape the approaching followers. As shown in Fig. 6, the intake side of plate 41 is pivoted at 43, to any fixed part, and the other side is normally urged upwardly by means such as a spring 44. To limit upward movement of said plate, the latter is provided with a lug 45, adapted to engage the bottom of guide 30. As will be seen in Fig. 6, the foremost end 46, of the board 47, is elevated free from possible engagement with guide 29, as the board is being advanced in the direction of its length, as will be later described.

I will next revert to the board alining table and describe the manner and means of advancing the sets of boards from a pile or stack onto said carrier.

The table includes a front liner plate 48 which preferably extends across the delivery end 2, of the table, with the lower edge 49 sufficiently elevated to permit of the thickest random thickness board to freely pass beneath said plate. Said plate may be adjustably anchored in any desired manner, as for instance by means of straps 50 and 51, so that the plate may be secured in the desired position. A side liner plate 52, extends lengthwise of the table rearwardly from plate 48 and may be secured to the top of the latter, as indicated at 52′, and by a strap 53′, to the table 1, in a manner to permit of said side plate 52, being adjusted to different lateral positions on the table. The lower edge 54, is in sufficient clearance from table 1, to permit of movement of table feeding means beneath the same, as will presently appear. A stop plate 55, which may be secured to side liner plate 52, serves to arrest any rearward movement of the stack of boards on retraction of said table feeding means, and this stop plate may be adjustably secured, as at 56, to said plate 52, to be adjusted lengthwise of the latter.

My improved table board feeding means, as shown, consists of a feeding bar 57, which is adapted to slide on top of table 1, and which is suitably connected by screws or bolts 58, through slots 3, with members 4, of the cross head, previously described. The crank disc 12, imparts a fixed stroke to feeder bar 57, in any event, and if longer boards than those shown at A, are to be fed, then the bar 57, is adjusted rearwardly or to the right of Fig. 1, into any one of the holes 59, in members 4. Therefore, it will be seen that I have provided a reciprocating feeding mechanism including a feeding member having a reciprocating stroke of a fixed length, and adapted to be adjusted to alter its starting and stopping positions in accordance with the length of boards to be fed. Inasmuch as the bar 57, feeds the boards A, from the bottom of the stack or pile, I will hereinafter refer to the same as an under-feeding means or mechanism.

This under-feeding means is adapted to cooperate with a board advancing mechanism, the function of the latter being quickly to advance a set of fed boards across and onto the carrier, heretofore described.

My improved advancing means consists, as shown, of coacting feeding or advancing rolls 60 and 61, which are shown disposed between the under-feeding means and the carrier, said rolls being disposed with their axes substantially parallel with the length and direction in which the upper lap of the carrier travels.

Journal guides 62 and 63 are provided at the ends of said rolls 60 and 61 and are suitably mounted on the frame member 18, and the said guides are alike in construction and operation so only one is shown in section in Fig. 3, which is the one nearest the driving means for the rolls. Roll 60, is an undivided roll and has a shaft 64 which is rotatable in journal box 65, suitably fixed in guide 63. Said shaft is journalled in fixed bearings 66 and 67, mounted on the machine frame, and between these bearings is a pinion 68. On the outer end of said shaft 64, is a bevel gear 69, meshing with bevel gear 70, on shaft 71, journalled in bearing 72, fixed on the machine frame. On the lower end of shaft 71, is a bevel gear 73, which meshes with bevel gear 74 on shaft 75, mounted in bearings 76 and 77. A sprocket 78, is mounted on shaft 75, and a chain 79, is trained about sprocket 78, and a sprocket 80, the latter being mounted on drive shaft 23. Thus I have disclosed the manner in which power is applied to posi-

tively rotate roll 60, in a contra-clockwise direction, looking at Fig. 2. I will next describe the manner in which drive is imparted to roll 61, to rotate the latter in a clockwise direction, looking at Fig. 2.

A bearing bracket 81, fixed to frame 18, has pivoted thereto bearing arms 82 which can raise and lower about pivot 83. Roll 61, has a shaft 84, which is journaled in box 85, the latter being vertically slidable in guide 63. Said shaft 84, extends through the journal ends of bearing arms 82 and has fixed thereon a pinion 86, which meshes with pinion 68. The teeth of said pinions 86 and 68 are of sufficient length so that when the pinion 86 moves upwardly, as far as it is ever called upon to do, it will not be out of mesh with pinion 68. The guide 63, limits box 85, to a vertical path of movement but there is enough play so that the pinion 86 can swing about 83, as a center, in view of the very limited movement required. A bolt 87, is fixed to box 85 and extends upwardly through the top 88, of guide 63, and through a spring abutting bar 89, mounted on guides 62 and 63. A nut 90, serves to limit downward movement of box 85, and shaft 84. A nut 91, limits upward movement of the same.

The coacting rolls 60 and 61 are spring urged against separation beyond a minimum extent, which minimum is slightly less than the minimum thickness of board to be gripped and advanced by said rolls but roll 61, is capable of upward movement from roll 60, to a limited extent, against such spring resistance, namely, to the extent permitted by nut 91. Further, in view of the fact that the rolls are called upon to advance boards which are not only of random thickness but also of random width, it is a feature of my invention to provide a sectional roll wherein the sections are not only independent yieldable, but also, wherein the sections are narrower than any board that the machine is charged with, which features I will next describe in detail.

Referring to Figs. 3 and 5, I have designated the sections of roll 61, at 92, all the sections being the same in structure and operation. On top of each section 92 is a saddle 93 having a lower arcuate face that extends about substantially half of the circumference of the section. On top of said saddle 93, is a foot 94 having a stud 95, which slidably extends through bar 89. A nut 96, limits downward movement of said foot. An expansibly acting spring 97, is interposed between said foot and said bar and normally urges section 92, downwardly. These sections 92, have a bore 98, somewhat enlarged with respect to shaft 84, to permit said sections 92 some latitude of up and down movement responsive to said springs 97. In order to drive sections 92, shaft 84 is provided with a key 98', which loosely extends into a key-way 99 formed in section 92 whereby enough latitude of play is afforded said section, and still, the section is maintained in driven relation with said shaft. I have shown the simplest form of driving connection between shaft 84 and sections 92, merely to illustrate one manner of affording up and down movement for said sections and still retaining the latter in driven relation with said shaft.

I will next describe the operation of my improved board delivering mechanism.

As previously stated, this machine is primarily designed for handling prepared stock, and hence, in practice, the boards forming the centers or bodies of the box ends are prepared and piled in a stack B, accessible to an operator standing near table 1, and in forming the stack B, the boards of random width are sorted so that irrespective of the variation of width of independent boards, as C, D and E, the aggregate of all of them, will form a set of boards of substantially the width of the center of the box end. It will be noted that the top set of boards C to E, of the supply pile B, vary in independent widths with respect to the boards of the top set on table 1, as shown in Fig. 1. Still, the length and total width of all the sets are substantially uniform. The table 1, and the feeding bar 57, are provided in order to permit an operator to pile sets of boards into a position to be fed, in quantities, so that the machine can be speeded up materially beyond the capacity of any operator in feeding boards singly, or by single sets. It is a feature of the invention to feed the boards in the direction of their length because if they were fed in a direction transverse to their length, the difference in thickness of stock of this class, would result in interference such as would cause clogging, as one set of boards can not be underfed, or successfully overfed from a stack wherein the next adjacent set of boards of different thickness would present offsets or shoulders blocking the set of boards being fed. Hence the boards are stacked on table 1, with their front ends against plate 48, and their side edges against plate 52, to properly aline the stack. The underfeed means also has great advantages over other feeds because it permits unlimited stacking, free from interference, in excess of the capacity of the machine to deliver.

Viewing Fig. 1, the bar 57, is about to advance against the right hand or rear end edges of the lowermost set of boards and feed them endwise through the throat formed by edge 49 (Fig. 2) into or between the normally spaced rolls 60 and 61, which are normally spaced apart less than the thinnest board, and which rolls are constantly running. Just as soon as the foremost ends of the boards enter the rolls 60 and 61,

the yielding sections 92 retract, and then the rolls take advancing hold of the boards and because the surface speed of the rolls is in excess of the speed of travel of bar 57, there can be no interference between the two feeding means as the faster operating rolls pull the boards away from bar 57, before the latter has completed its feeding stroke. As the lower set is advanced from beneath the stack, the latter descends onto table 1, and bar 57, and the stop 55, will be adjusted into such position that retraction of bar 57, back to a starting position, will not shift the board stack away from engagement with plate 48, and the bar 57, will be in the position shown in Fig. 1, ready to feed another set of boards.

The rolls 60 and 61 rapidly advance the boards, or rather a whole set of boards, transversely of the carrier and into substantially the position shown by the board in Fig. 1. The plate 41, prevents interference of the front or foremost fed ends of the boards with guide 29, or chain 27, by lifting the forward ends of the boards slightly, as shown. The arrangement and timing are such that almost immediately after a set of boards has been advanced across the carrier, a follower 34 will engage the side edge of one board, and as soon as the follower engages the downwardly rounded edge of plate 41, the latter will be depressed by the edge 39, of the follower, thereby allowing the set of boards to rest on the support guides 29 and 30, and be advanced thereon by the follower.

At this point, it is desired to emphasize the very great importance of the change of direction of movement of the sets of boards from the direction imparted thereto by rolls 60 and 61, to the direction imparted by the carrier. In the first place, the followers are spaced apart a slightly greater extent than the aggregate width of a set of boards so that the sets will not only be retained segregated, as they are advanced by the carrier, but so that they can be advanced between groove formers for forming grooves in the ends of the boards, and subsequently presenting said ends for entrance therein of tenoned cleats. Thus, it will be seen that the function of the carrier is not merely to advance boards delivered to it, in a helter-skelter manner, but in an orderly manner with the sets of boards intact, and one set in separated relation from another set.

It will also be noted that the boards of the sets are in loose parallel relation when delivered by the rolls, onto the carrier, hence, by having the carrier travel in a direction substantially at right angles to the direction in which the sets of boards are fed onto and across the carrier, the followers of the latter, engaging the set laterally thereof, act to hold the boards in parallel relation, the slight friction of the forward boards on the guides 29 and 30, being sufficient to hold the forward boards of the set, back in engagement with the rear board engaged by the follower.

Now it is clear that the set of boards, at this point, are in parallel relation, but as they have not reached the alining means, the ends of the boards of the set, may not be flush, and further, the boards are not in engagement with the liner guide 32. However, just as soon as the carrier advances the boards sufficiently to engage the bend 34′, of the liner shifting guide 33′, the boards will be endwise shifted toward and into engagement with liner guide 32, thereby making the end portions flush, at both ends of the set of boards.

After the set of boards has been shifted into alined relation, the carrier advances the boards between devices for forming grooves in the ends of the boards, and later, nailing strips are inserted into the grooved ends, all of which is not herein shown, but is set forth to bring out the importance of the machine, as hereinbefore set forth.

It is believed that my invention will be fully understood from the foregoing description, and while I have herein shown and described one specific form of my invention, I do not wish to be limited thereto except for such limitations as the claims may import.

I claim:—

1. In a board delivering mechanism, a stacking table having front and side liner plates and adapted to receive a stack of superimposed sets of loose boards of random thickness and uniform length with the stack in endwise abutting relation against said front liner and in sidewise abutting relation against said side liner, the lower edge of said front liner plate being sufficiently elevated with respect to said table to form a throat for passage therethrough of the lowermost set of boards, a carrier running transversely of said table and having followers for engaging the loose sets of boards laterally thereof, feeding rolls for advancing a set of loose boards in the direction of their length and through said throat and onto said carrier, and means for advancing the lowermost set of loose boards from said stack in the direction of their length into and between said feeding rolls.

2. In a board delivering mechanism, a stacking table adapted to receive a stack of superimposed sets of loose boards of substantially uniform length, a carrier running transversely of the end of the stacked boards and having followers for laterally engaging each loose set of boards, feeding rolls for advancing a set of loose boards in the direction of their length onto said carrier, and means for advancing the lowermost set of loose boards

from said stack in the direction of their length into and between said feeding rolls.

3. In a board delivering mechanism, a stacking table adapted to receive a stack of superimposed sets of loose boards, a carrier running transversely of the end of the stacked boards, a guide liner on that side of said carrier remote from the intake side, feeding rolls for advancing a set of loose uniform length boards in the direction of their length onto said carrier laterally of the length thereof, and means extending between said rolls and along said carrier for advancing the loose boards into endwise engagement against said guide liner as said boards are advanced by said carrier.

4. In a board delivering mechanism, a carrier having an intake side and a guide liner on that side of the carrier remote from the intake side thereof, means for feeding a set of loose uniform length boards in parallel relation and in the direction of their length onto said carrier laterally of the direction of travel thereof and onto the same from the intake side thereof, and means extending along the intake side of said carrier for shifting the delivered boards into endwise engagement with said guide liner as said boards are being advanced by said carrier.

5. In a board delivering mechanism, a carrier, means for feeding a set of loose uniform length boards in parallel relation and in the direction of their length across and onto said carrier, and mechanism for alining the ends of the delivered boards as the latter are advanced by said carrier.

6. In a board delivering mechanism, a carrier, coacting feeding rolls for advancing a set of loose and random thickness boards in parallel relation and in the direction of their length across and onto said carrier, and one of said rolls being composed of spring urged sections independently yieldable to accommodate for boards of different thickness, or width.

7. In a board delivering mechanism, an endless carrier, board feeding means disposed lengthwise of and in lateral relation to said carrier for advancing a set of loose parallel boards in the direction of their length across and onto said carrier while the latter is running, and means for lifting the foremost ends of the boards free from interference with the running carrier as the boards are being advanced onto the latter.

8. In a board delivering mechanism, a board alining table adapted to receive sets of uniform length and loose random thickness boards in parallel relation with the sets of boards in superimposed stacked form, means for advancing a set of boards in the direction of their length away from said stack, and carrier mechanism engaging said advanced boards laterally and moving them in a direction angular to their first direction of advance to hold said boards in lateral relation, and means for shifting said boards into accurate flush end relation as said boards are being advanced by said carrier.

9. In a board delivering mechanism, a stacking table adapted to receive a stack of boards to be delivered, feed rolls at the delivery end of said table, reciprocating cross head means slidably connected with said table and having a fixed stroke, and a feed bar for advancing boards from the stack in the direction of their lengths said bar being adjustably connected with said means to feed boards of different length into operative relation with said rolls.

10. The herein-described method of delivering boards, which consists, in successively advancing sets of loose boards in parallel relation and of random width and thickness in the direction of the length of such boards from a stack thereof and retaining said boards of each set in substantially their initial relation throughout advancing movement of said boards, in successively receiving and delivering such advanced sets of boards laterally of the length thereof with the sets segregated and with the boards of each set in compact lateral relation, and in endwise shifting the boards of each set as the latter are being delivered to dispose the ends of said boards in flush relation.

In testimony that I claim the foregoing as my own, I hereby affix my signature.

ALBERT E. CRANSTON.