Jan. 6, 1959 H. C. COOK 2,867,323

LUMBER SORTING MACHINE

Filed Feb. 12, 1958 3 Sheets-Sheet 1

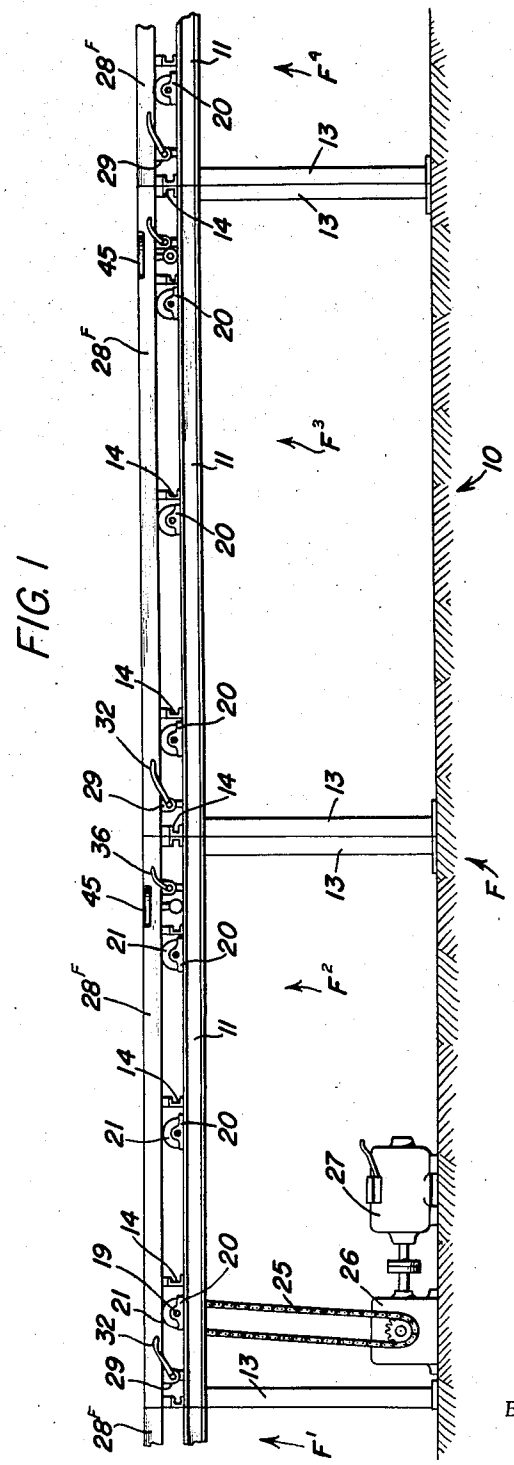


FIG. 1

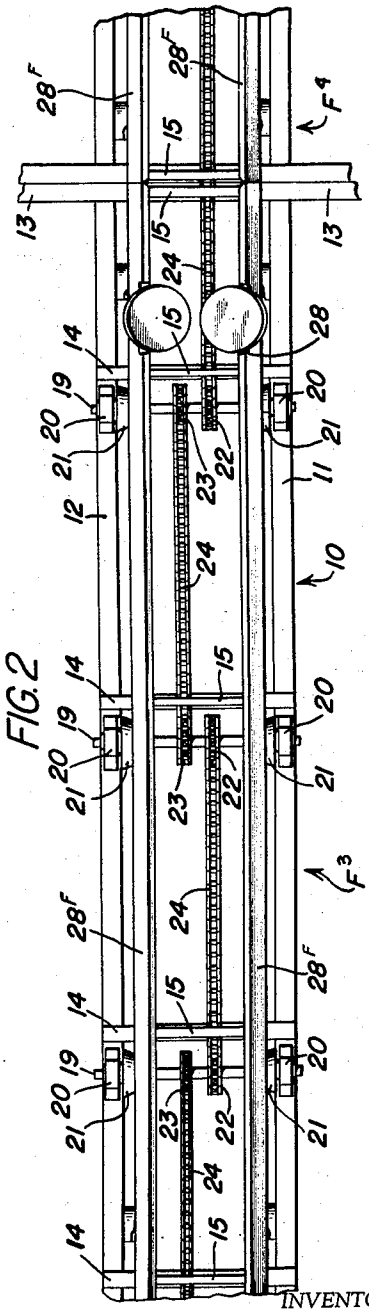


FIG. 2

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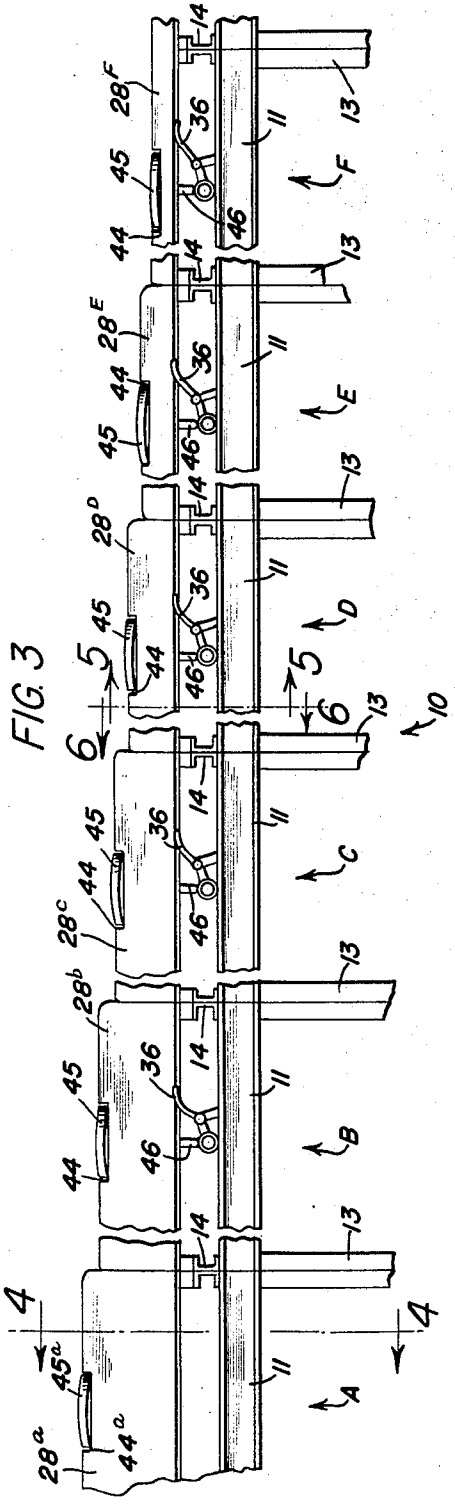


FIG. 3

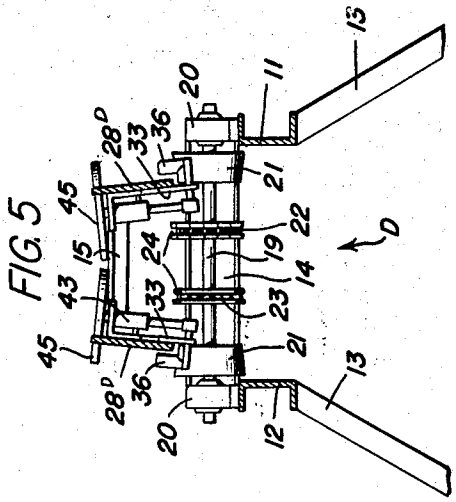


FIG. 5

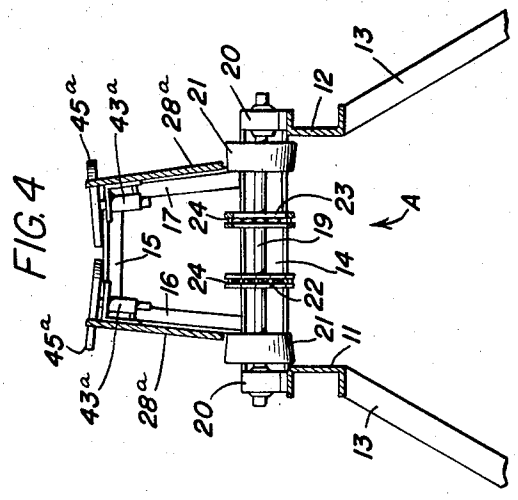


FIG. 4

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LUMBER SORTING MACHINE

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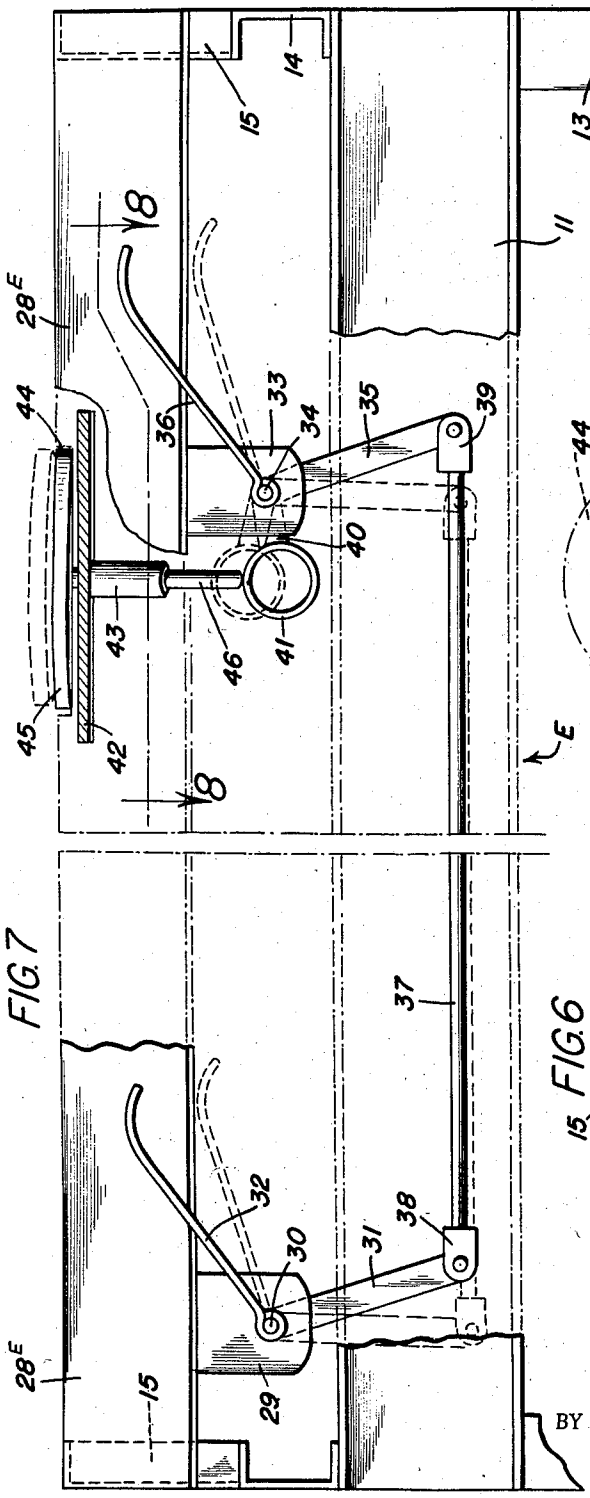


FIG. 7

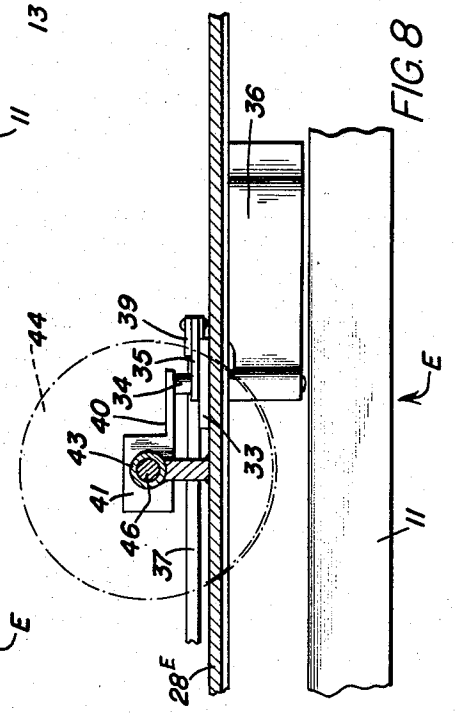


FIG. 8

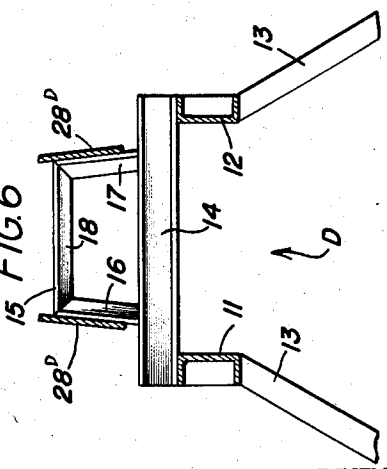


FIG. 6

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LUMBER SORTING MACHINE

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Application February 12, 1958, Serial No. 714,859

5 Claims. (Cl. 209—90)

The present invention relates to lumber sorting machines, and particularly to lumber sorting machines which separate lumber according to length and width.

The primary object of the invention is to provide a lumber sorting machine which will rapidly and effectively sort lumber both as to width and as to length in a continuous operation.

Another object of the invention is to provide a lumber sorting machine of the class described above in which the frictional drag on the lumber is relatively low to permit the operation of the machine with a minimum of power.

A further object of the invention is to provide a lumber sorting machine of the class described above having an automatic ejector to remove the lumber from the machine at the desired station.

Another object of the invention is to provide a lumber sorting machine of the class described above in which the conventional outer fence or guide is eliminated so that crooked and warped lumber can move through the device without jamming or breaking the mechanism.

A still further object of the invention is to provide a lumber sorting machine of the class described above which is inexpensive to manufacture, simple to use, and which is completely effective in separating the lumber into the desired widths and lengths.

Other objects and advantages will become apparent in the following specification when considered in the light of the attached drawings, in which:

Figure 1 is a fragmentary side elevation of the invention.

Figure 2 is a fragmentary top plan view of the invention.

Figure 3 is a fragmentary side elevation of the invention with parts broken away for convenience of illustration.

Figure 4 is an enlarged fragmentary transverse cross-section taken along the line 4—4 of Figure 3, looking in the direction of the arrows.

Figure 5 is an enlarged fragmentary transverse cross-section taken along the line 5—5 of Figure 3, looking in the direction of the arrows.

Figure 6 is an enlarged fragmentary transverse cross-section taken along the line 6—6 of Figure 3, looking in the direction of the arrows.

Figure 7 is an enlarged fragmentary side elevation shown partially broken away and in section for convenience of illustration.

Figure 8 is a fragmentary horizontal cross-section taken along the line 8—8 of Figure 7, looking in the direction of the arrows.

Referring now to the drawings in detail wherein like reference characters indicate like parts throughout the several figures, the reference numeral **10** indicates generally a lumber sorting machine constructed in accordance with the invention.

The lumber sorting machine **10** consists of a plurality of longitudinally extending aligned sections A, B, C, D, E, and F, as shown in Figure 3. Each of the sections B, C, D, E, and F, consist of a plurality of stations, as illustrated in Figure 1, at F1, F2, F3, and F4.

The sections A, B, C, D, E, and F are arranged in aligned relation, and in the sorting of lumber, the boards are fed into section A, passing successively through the sections B, C, D, E, and F until ejected.

In the instant lumber sorting machine **10**, the section A sorts boards of twelve inch width, section B ten inch width, section C eight inch width, section D six inch width, section E five inch width, and section F four inch width. Sections B, C, D, E, and F are each provided with five ejection stations for sorting boards into eight feet, ten feet, twelve feet, fourteen feet, and sixteen feet lengths.

While the lumber sorting machine **10** has been disclosed with a specific number of sections each having a specific number of stations, it should be understood that the number of stations and number of sections will be varied to sort boards into any desired selection of widths and lengths.

The sections A, B, C, D, E, and F each include a pair of laterally spaced horizontal longitudinally extending channel frame members **11, 12** supported on a plurality of laterally diverging legs **13**. A plurality of transversely extending cross frame members **14** engage the tops of the channel frame members **11, 12** and are secured thereto by welding or the like.

Each of the transverse frame members **14** is provided with an upstanding inverted U-shaped angle iron frame **15** which includes an upper horizontal frame member **18** arranged parallel to the frame member **14** and a pair of diverging legs **16, 17** having their upper ends, respectively, secured to opposite ends of the horizontal frame member **18**, and the lower ends secured to the transverse frame members **14** intermediate the opposite ends thereof.

A plurality of transversely extending shafts **19** are arranged in longitudinally spaced parallel relation along the longitudinal frame members **11, 12** and have their opposite ends journalled in bearing blocks **20** secured to the upper side of the channel frame members **11, 12.**

Each of the transverse shafts **19** are provided with a pair of drive rollers **21** positioned in spaced apart relation thereon adjacent the bearing blocks **20.** The rollers **21** are each tapered and have their largest diameters outermost on the shafts **19** and their smaller diameters innermost. The rollers **21** adjacent the channel frame members **11** are arranged with their upper surfaces in horizontally and longitudinally aligned relation. The rollers **21** positioned adjacent the longitudinal frame member **12** are similarly aligned.

The shafts **19** intermediate the rollers **21** are provided with a pair of spaced apart sprockets **22, 23** and a plurality of endless chains **24** connect alternate adjacent pairs of sprockets **22** and alternate adjacent pairs of sprockets **23,** as best shown in Figure 2.

A drive chain **25** is connected to one of the shafts **19** and depends therefrom to engage a speed reducing transmission **26.** A motor **27** is coupled to the speed reducing transmission **26** to drive the chain **25,** and through the chains **24,** all of the shafts **19.** The chain **25** can be connected to any one of the shafts **19** to position the motor **27** in a desired location.

A fence **28*a*** is formed of an elongated generally flat plate which is secured to opposite sides of the U-shaped frame member **15,** as is best shown in Figure 5. The

fence 28*a* extends through the section A, as illustrated in Figure 3. A fence 28*b*, somewhat shorter than the fence 28*a*, is similarly formed of a flat plate and is similarly supported on opposite sides of the U-shaped framework 15. The fence 28*b* extends through the section B. Sections C, D, E, and F are provided with fences 28*c*, 28*d*, 28*e*, and 28*f*, supported in the same manner as the fences 28*a* and 28*b* and having a successively narrower width, as clearly shown in Figure 3.

A depending support plate 29 is secured to the inner face of each of the fence plates 28*b*, 28*c*, 28*d*, 28*e*, and 28*f* at the admission end of each of the ejection stations such as F1, F2, F3, and F4 of Figure 1. In Figures 1, 2, 3, 7, and 8, the lumber moves from left to right in the operation of the machine.

A shaft 30 is journalled in each of the support plates 29 and extends perpendicularly to the support plate 29. A lever 31 is fixed to the shaft 30 and depends therefrom on the inner side of the support plate 29 and a trigger lever 32 is fixed to the shaft 30 on the opposite side of the support plate 29 and extends upwardly at an angle toward the discharge end of the machine. The trigger lever 32 extends above the top plane of the rollers 21 so that lumber moving on the rollers 21 will engage the trigger lever 32 and move it to the dotted line position illustrated in Figure 7.

A second support plate 33 is fixed to the fence plates 28*b*, 28*c*, 28*d*, 28*e*, and 28*f* in spaced paired relation to the support plates 29. A shaft 34 is journalled in the support plate 33 and extends perpendicularly thereto. A lever 35 is fixed to the shaft 34 and depends therefrom on the inner side of the support plate 33. A trigger lever 36 is fixed to the shaft 34 outwardly of the support plate 33 and extends upwardly therefrom at an angle inclined toward the discharge end of the machine.

A rod 37 is pivotally connected through a clevis 38 to the lower end of the lever 31 and pivotally connected to the lever 35 by a clevis 39, as best seen in Figure 7. The rod 37 maintains the levers 31, 35 and the trigger levers 32, 36 in respective parallel relation to each other.

An arm 40 is fixed to the inner end of the shaft 34 and extends in a generally horizontal plane toward the admission end of the machine. The arm 40 has a circular cam member 41 fixed to the free end thereof.

A support platform 42 is secured to each of the fence plates 28*b*, 28*c*, 28*d*, 28*e*, and 28*f*, in generally overlying relation to the support plate 33.

Each of the support platforms 42 have elongated generally upright tubular bushing members 43 depending therefrom and arranged parallel to the fence plates. A notch 44 is formed in the upper edge of each of the fence plates 28*b*, 28*c*, 28*d*, 28*e*, and 28*f*, as can be best seen in Figures 3 and 7.

A circular ejection plate 45 is positioned centrally of each of the tubular bushings 43 and has an axial depending shaft 46 journalled in the tubular bushing 43. The shaft 46 is arranged for engagement with the circular cam member 41 and reciprocates in the tubular bushing 43 as the circular cam 41 swings about the shaft 34. Movement of the shaft 46 raises the ejection plate 45 to the position illustrated in dotted lines in Figure 7. The ejection plate 45 in its lowermost position engages in the slot 44 and extends into the path of the lumber moving through the machine.

In section A of the machine an ejection plate 45*a* is journalled in a bushing 43*a* and extends through a notch 44*a* in the fence plate 28*a* to provide a fixed ejection station for purposes to be described.

The length of the shafts 46 depending from the ejection plates 45 will vary in accordance to the height of the ejection plate 45 above the rollers 21.

The distance between the trigger lever 32 and the ejection plate 45 in each ejection station of the individual sections is progressively lengthened so as to eject progressively longer boards.

In the use and operation of the invention the opposite sides of the machine are used, respectively, for sorting one inch boards and two inch boards. In the following description the operation of one side of the machine is described in detail and it should be understood that the operation of the opposite side is identical thereto.

Lumber to be sorted is placed on the rollers 21 in contact with the fence plate 28*a* and is moved to the right as viewed in Figures 1, 2, 3, 7, and 8. The ejection plate 45*a* is positioned slightly below the twelve inch level and all boards of a width of twelve inches or greater will contact the ejection plate 45*a* and will have their upper edges cammed outwardly thereby so that the boards will fall from the rollers 21 and are guided by the legs 13 into a pile.

Boards of a narrower width than twelve inches will pass beneath the ejection plate 45*a* and into section B of the machine. In section B the board will contact the trigger lever 32 moving it downwardly along with the trigger lever 36 raising the ejection plate 45 coupled thereto.

The board continues on the rollers 21 and if its length be greater than the distance between the trigger lever 32 and the ejection plate 45, the board passes under the ejection plate 45 into the next ejection station. If the board is shorter than the distance between the trigger lever 32 and the ejection plate 45 it will release the trigger lever 32 lowering the ejection plate 45 in time to eject the board from the rollers 21.

For any one width of board, the shorter length is ejected first and each successive ejection station has the trigger lever 32 and the ejection plate 45 spaced further apart to eject successively longer boards. The boards pass through sections C, D, E, and F and successively narrower widths of boards are ejected into the desired length assortments.

The trigger lever 36 is engaged by a board which has passed beneath the ejection plate 45 and maintains the ejection plate 45 in raised condition out of contact with the top edge of the board while the board passes therebeneath.

With the present invention, boards can be fed into the machine with a minimum of spacing between boards and the machine can be operated at a maximum capacity without endangering the accuracy of the sorting operation.

Having thus described the preferred embodiment of the invention, it should be understood that numerous structural modifications and adaptations may be resorted to without departing from the scope of the appended claims.

What is claimed is:

1. A lumber sorting machine comprising an elongated horizontal frame, a plurality of horizontally aligned rollers journalled to said frame, a fence plate secured to said frame above said rollers, said rollers having a tapered peripheral face with said fence plate extending perpendicularly from the upper portion of said tapered peripheral face, means to rotate said rollers simultaneously whereby said rollers move a board to be sorted through said machine in engagement with said fence plate, an ejector plate positioned in overlying relation to the upper edge of said fence plate, means extending generally upright parallel to said fence plate journalling said ejector plate and supporting said ejector plate for vertical sliding movement, and means positioned below said fence plate engageable by a board moving through said machine for raising said ejector plate out of the path of the board moving through said machine.

2. A device as claimed in claim 1 wherein the means positioned below said fence plate for raising said ejector plate out of the path of a board moving through said machine includes a trigger lever journalled on a horizontal axis and a second lever spaced longitudinally therefrom, said second lever being connected to said first lever by link means, and carrying cam means thereon for moving said ejector plate vertically.

3. A device as claimed in claim 2 wherein said second

lever is provided with a board engaging trigger lever for maintaining said ejector plate in elevated position as a board passes therebeneath.

4. A device as claimed in claim 1 wherein said rollers are mounted on transversely extending shafts journalled to said frame with each of said shafts having a pair of sprockets fixed thereto, and an endless chain connecting adjacent sprockets of adjacent shafts in pairs.

5. A device as claimed in claim 1 wherein said fence plates are arranged in groups of successively narrower widths and said ejector plates are successively closer to said rollers in each group.

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