

June 30, 1964

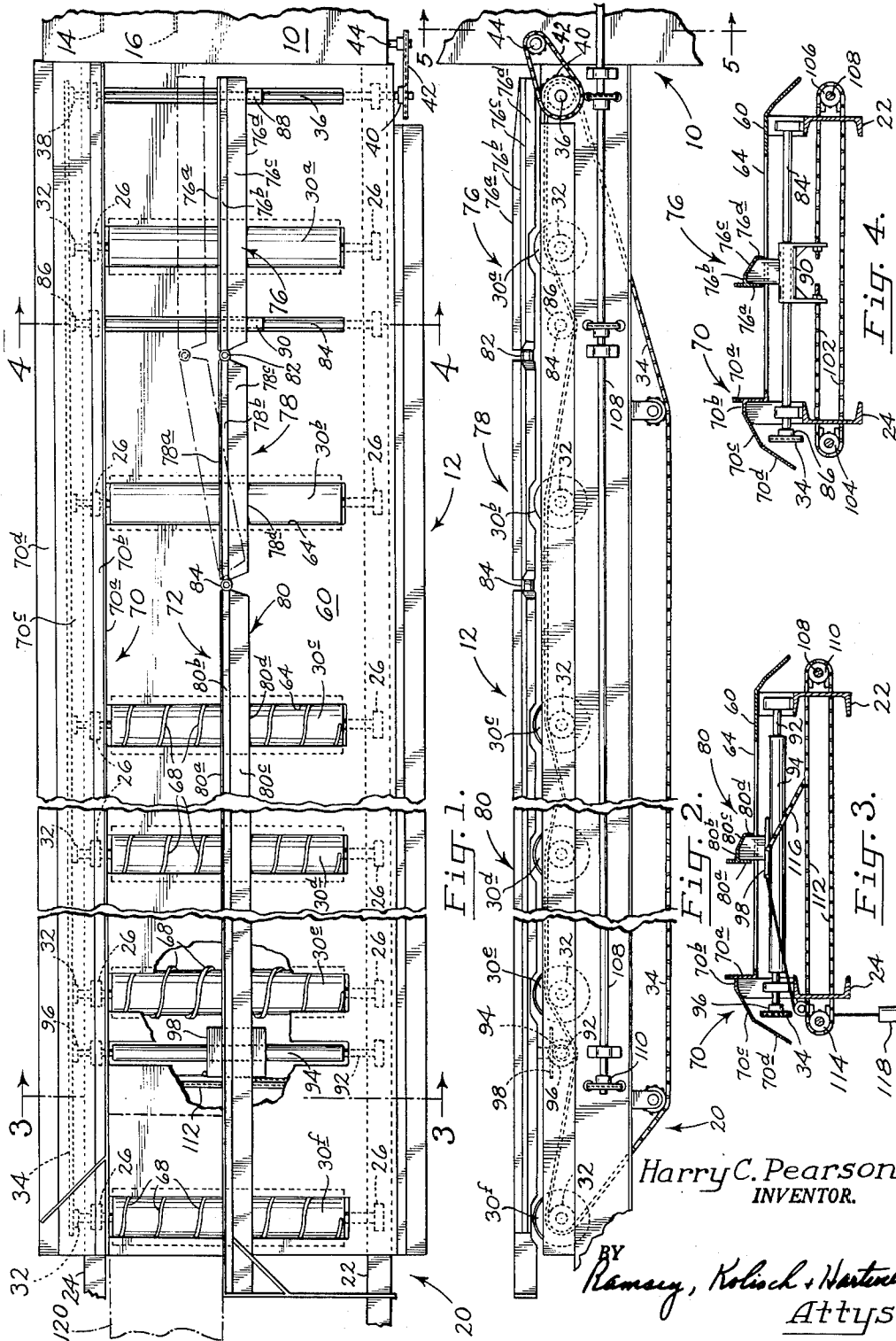
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EDGER PICKER

Filed Oct. 23, 1961

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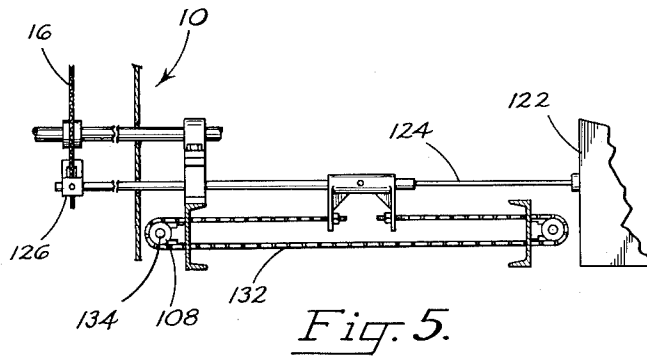
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1

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EDGER PICKER

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This invention relates generally to article-handling and sorting apparatus, and more particularly to apparatus for separating out from a flow of articles a certain portion thereof, enabling the divided portions resulting then to be processed in the most optimum manner.

In general terms, an object of the invention is to provide apparatus of the type described that is relatively compact, and simple in construction, yet entirely satisfactory in performing the separation function desired.

Yet another general object is to provide such apparatus that is relatively fast in its operation, and as a consequence can accommodate a substantially uninterrupted flow of articles therethrough.

In a lumber mill, rough boards may be cut from a log, and in a subsequent operation these are sent through an "edger," where bark and wood of uneven outline along the edges of the boards are removed to leave a board having a substantially rectangular cross section. These boards may then be further processed, as by cutting them again, sanding them, grading them, etc. Optimum efficiencies usually result if the edgings on leaving the edger are immediately separated out from the flow of boards, enabling the boards to be further processed without encumbrance by the edgings, and the edgings to be burned or otherwise treated. Apparatus for performing this separating function is sometimes referred to in the industry as an "edger picker," and this invention more particularly relates to improvements in such apparatus.

Thus, an object of this invention is to provide an improved edger picker, or like apparatus, comprising a novel sorter or "picker" arm, and a mounting for the same constructed to accommodate substantially immediate shifting of the arm to accommodate different settings of the edger saw or its equivalent in the edger preceding the edger picker.

Another object is to provide an improved picker or sorter arm, in the form of an articulated structure, and that comprises a forward section, and a trailing section (or follow-up section), with the trailing section operable to follow movement of the forward section when the latter is shifted laterally, but constructed so as to permit a time delay before such movement occurs. This is advantageous, for instance, when handling first a wide and then a narrow board, as it permits the narrow board to travel into the edger picker substantially immediately after the wide board and before the wide board has cleared the edger picker.

A further object is to provide sorting apparatus, such as an edger picker, that includes a picker arm extending substantially continuously over the path of travel for boards defined by a conveyor in the apparatus, with such arm operable to perform sorting while the pieces undergoing separation are all supported approximately at the level of the support plane of the conveyor. In constructions that require boards, for example, to drop to a lower level while being sorted, the trailing ends of the boards tilt upwardly during the downward progress of the boards, producing clearance problems, all of which are eliminated by the apparatus of the invention.

Another object of the invention is the provision of novel power-operated means for urging the trailing end of a picker or sorter arm in a direction following movement of the forward end of the arm, when the forward end is shifted laterally.

These and other objects and advantages are attained

2

by the invention, and the same is described hereinbelow in conjunction with the accompanying drawings, wherein:

FIG. 1 is a plan view of apparatus constructed as contemplated according to one embodiment of the invention, such apparatus including a pair of laterally spaced "pickers" or sorting arms, and beneath the arms a series of rollers for transporting boards;

FIG. 2 is a side elevation of the apparatus illustrated in FIG. 1;

FIG. 3 is a cross-sectional view, taken generally along the line 3—3 in FIG. 1;

FIG. 4 is a cross-sectional view, taken generally along the line 4—4 in FIG. 1; and

FIG. 5 is a view along the line 5—5 in FIG. 2 illustrating mechanism connecting a saw in an edger unit with a picker or sorting arm whereby the two move conjointly.

Referring now to the drawings, 10 indicates generally an edger unit, and on the off-bearing side of the edger unit, and receiving material passing from the unit, apparatus referred to herein as an "edger picker," such being indicated generally at 12.

Edger unit 10 may be of conventional construction, and is positioned in the usual lumber processing line after the saw or saws that cut a log into rough boards having bark and wood of uneven contour along one or more of their side edges. Typically, the edger unit may contain at least a pair of saws, and these may be circular saws, and such are indicated generally by the dotted outlines at 14 and 16. In the edger unit, saw 14 that cuts the upper margin of a board in FIG. 1 may be a stationary or non-traveling saw, and the position of the freshly cut edge produced by the saw in a board remains unchanged relative to the edger picker apparatus that follows. Saw 16 represents an adjustable saw, and is adjustable laterally in unit 10, thus to cut wide or narrow boards, depending upon the width of the rough boards fed to the edger unit.

The edger unit has only generally been described, as details of its construction are unnecessary for an understanding of the invention. Variations in its construction, of course, are possible. For instance, more than two saws may be provided, to permit ripping of the board in the edger unit at the same time that the board has its edges removed. It is not meant by this general discussion to be limited to any particular type of edger unit, as the above description has been for illustrative purposes only.

Edger picker apparatus 12 on the off-bearing side of the edger unit comprises a stand or frame 20, including elongated parallel beams 22, 24 supported above the floor in a suitable manner. Mounted on frame 20, with ends journaled in bearing assemblies 26 secured to beams 22, 24, are a series of rollers 30a—30f. The rollers are substantially parallel to one another, and are aligned in a row extending along the length of apparatus 12. The rollers constitute a conveyor means in the apparatus, and define a path of travel for boards, with such boards leaving the edging unit and then traveling from right to left through apparatus 12 in FIGS. 1 and 2. On leaving apparatus 12, boards conventionally travel to succeeding portions of a lumber processing line (not shown).

Rollers 30a—30f preferably are rotated under power. Explaining the drive for the rollers, one set of their ends may be provided with sprockets, such as sprockets 32. Trained over these sprockets is a chain 34. Extending transversely of the apparatus at the front end of the machine, i.e., the end of the machine directly adjacent the edger unit, is a shaft 36. Shaft 36 is also journaled on the frame, and has secured to one end a sprocket 38 meshing with chain 34 trained thereabout. The opposite end of shaft 36 is connected through a sprocket 40 and chain 42 to a suitable power source, such as power-rotated shaft 44. Shaft 44 may be driven by the same motor rotating saws 14 and 16. Thus, the rollers are driven by a common

power source and rotated simultaneously. It should be obvious, of course, that other power-operated means may be used to drive the rollers than the one described.

Preferably a substantially continuous supporting surface is provided along the length of the conveyor means, in order to prevent short boards or pieces from becoming jammed, or dropping down through the apparatus. Thus, in the embodiment illustrated, plate structure indicated generally at 60 and supported on beams 22, 24 is included. The plate structure is suitably apertured, as at 64, to receive upper portions of the rollers that project upwardly through the plate structure. With a conveyor means comprising rollers as described, the plate structure functions to guide short pieces of material, that otherwise would drop down between the rollers, forwardly along the conveyor means to its off-bearing end.

At least some of the rollers 30a-30f preferably have helical flanges about their peripheries. In the embodiment illustrated, rollers 30c-30f have such flanges, indicated at 68. The flanges on rotation of the rollers operate to produce side shifting of material (thus a self-clearing action) in a downward direction in FIG. 1.

As previously indicated, saw 14 may be a nontraveling saw, and saw 16 an adjustable saw that is adjustable laterally to accommodate the cutting of boards of different widths. A picker or sorter arm is provided in the edger picker apparatus having a position related to the position of each saw. Thus, supported on frame 20 and extending in the direction of the path of travel of material thereover is a fixed picker arm 70, having a stationary position on the frame 20 and aligned with stationary saw 14. Laterally spaced from picker arm 70 is a picker arm 72, referred to as a movable picker arm, and adjustable laterally in the apparatus together with saw 16.

The stationary picker arm comprises an elongated upstanding plate portion 70a secured to structure 60 and providing a shoulder or fence that guides the edge of a board cut by saw 14. Laterally outwardly of plate portion 70a is an elongated, relatively narrow and horizontal portion 70b, and joined to portion 70b and spaced laterally outwardly therefrom are sloping portions 70c, 70d. An edging cut by saw 14 is divided from the board it was cut from by portion 70a, and then deflected outwardly and to one side of the apparatus by portions 70b, 70c, 70d. Portions 70b, 70c, 70d at the same time protect chain 34 and sprockets 32 from debris being thrown thereon. Horizontal portion 70b supports a heavy edging until it is completely cut from a board.

Movable picker arm 72 is articulated, and in the embodiment illustrated comprises a forward section 76, an intermediate section 78, and a trailing or follow-up section 80. The three sections or portions are interconnected, with the forward end of the intermediate section being pivoted at 82 to the rear end of the forward section, and the forward end of the trailing section being pivoted at 84 to the rear end of the intermediate section. The articulated structure selected enables the forward portion of the picker arm to have a different spacing from the fixed picker arm than the rear portion, during operation of the apparatus, and as will hereinafter be described.

Each of the sections of movable picker arm 72 has a construction resembling somewhat the construction of the fixed picker arm. Thus, in each there is provided an upstanding plate portion, indicated for the various sections at 76a, 78a, 80a. Laterally outwardly of this upstanding portion, and providing surfaces for deflecting edgings to one side of the apparatus, are a horizontal portion (indicated at 76b, 78b, 80b), a sloping portion (indicated at 76c, 78c, 80c), and an edge portion (indicated at 76d, 78d, 80d).

An important feature of this invention is that both of the picker arms extend substantially continuously over the top of the conveyor means. The fixed picker arm may be supported in this position, as has been described, by mounting it on plate structure 60. In the case of the mov-

able picker arm, its forward section is mounted on guides, accommodating lateral movement of the section with the section maintained parallel to the forward part of the fixed picker arm. The trailing section is supported by means accommodating both lateral and longitudinal movement thereof, in the plane of the conveyor means, whereby some lateral swinging movement in the intermediate and trailing section is permitted during operation of the apparatus.

More specifically, at 84 there is indicated a shaft, journaled on frame 20 that parallels shaft 36 already described and that is spaced rearwardly in the apparatus from shaft 36. Shaft 84, like shaft 36, is rotated under power, through a sprocket 86 engaging chain 34. Sleeves 88, 90 encircle intermediate sections of the shafts, and forward section 76 is secured to these sleeves. The sleeves are slidable to and fro on the shafts, and function to keep forward section 76 parallel to picker arm 70 while mounting the same for lateral movement. Shafts 36 and 84 are lubricated, and when rotated within sleeves 88, 90 provide a low friction mounting for section 76.

Considering the support for trailing section 80, at 92 is indicated a rotatable shaft having an enlarged intermediate section 94. The shaft is driven through sprocket 96 engaging chain 34. Secured to the underside of trailing section 80 is a bearing plate 98, such is slidably supported on the top of intermediate section 94. The plate supports the trailing section while accommodating movement of the end of the section both laterally and longitudinally of the edger picker apparatus. Shaft 92 is lubricated, and when rotated provides a low friction support for plate 98 and the trailing section.

In the edger picker apparatus, section 76 is shifted laterally under power, to different positions, whereby it remains aligned with movable saw 16 in the edger unit. Explaining the mechanism for shifting forward section 76, and referring to FIG. 4, extending transversely of the apparatus, and positioned under shaft 84, is a chain 102. The chain is trained over sprockets 104, 106 mounted on either side of frame 20. Chain 102 has ends secured to sleeve 90 which mounts section 76. Sprocket 106 is secured to a shaft 108 (see also FIG. 2) extending along the side of the apparatus and into edger unit 10. Within the edger unit shaft 108 is connected by conventional mechanism 109 (see FIG. 5) to movable saw 16, in such a manner that the shaft is rotated simultaneously with and in a direction determined by movement of saw 16. The connection is such that on movement of saw 16 toward or away from saw 14, an equal amount of movement in the same direction occurs in sleeve 90 and section 76.

Referring to FIG. 5, where mechanism 109 is illustrated connecting saw 16 in edger unit 10 and shaft 108, a conventional set works is illustrated at 122, which has projecting therefrom a rod 124. Connected to one end of rod 124 is a yoke 126 that embraces the perimeter of saw 16. Rod 124 is extended from or retracted into the set works to produce a corresponding lateral movement in saw 16. Rod 124 is anchored to a chain 132 trained about sprockets including a sprocket 134 secured to shaft 108.

Power-operated means is also provided for urging the trailing section 80 to different positions whereby it tends to remain aligned with saw 16. The construction is such, however, as to allow a delay in the movement of the section in those instances when saw 16 is shifted laterally to a position closer to saw 14. Thus, and with reference now to FIGS. 2 and 3, shaft 108 extends rearwardly to a location adjacent shaft 92. Adjacent the end of shaft 108 there is secured a sprocket 110, and a chain 112 is trained over sprocket 110. Also mounting chain 112 is a sprocket 114 suitably mounted on the frame of the apparatus opposite sprocket 110. A chain or flexible member, indicated at 116, interconnects the trailing section and chain 112. Exerting a bias on the trailing section urging it toward fixed picker arm 70 is a weight 118. On movement of chain 112 in a clockwise direction in FIG. 3, chain 116 is

tensed, and produces a corresponding movement in the trailing section. When chain 112 is moved in a counter-clockwise direction, weight 118 urges a corresponding movement in the trailing section, while accommodating a delay in such movement should a board between section 80 and the fixed picker arm prevent it.

Explaining now the operation of the apparatus, and with reference to FIG. 1, the movable picker arm in the position illustrated in solid outline extends substantially in a straight line. This is the position of the picker arm when the apparatus is used to pick edgings from a board having the width of board 120 shown at the left in FIG. 1.

Let it be assumed now that a narrower board is to have edgings cut therefrom in the edger unit, necessitating movement of movable saw 14 to a position closer to fixed saw 16, and a reduction in the spacing between the fixed and movable picker arms. When this occurs, saw 16 is suitably adjusted, and because of its connection with section 76 of the movable picker arm through chain 102, section 76 moves an equal distance in the same direction. The dashed outline for section 76 illustrates its new position.

On such movement of section 76 inwardly, the articulated sections hinged thereto shift, somewhat as indicated by the dashed outlines for the sections in FIG. 1. Thus, the intermediate section is shown in an inclined position relative to the fixed picker arm, and has its rear end shifted forwardly slightly, to take care of the angularity in its position. The rear or trailing section remains substantially parallel to the fixed picker arm, and spaced from the arm the same as before, but also is shifted forwardly, the same distance that the end of the intermediate section has shifted. In this new condition of the arm, weight 118 exerts a force on the trailing section urging it to follow the forward section to a closer spacing with the fixed picker arm.

Upon board 120 leaving the picker arms the trailing section moves into alignment with the forward section, under the urging of weight 118. The two picker arms now are substantially parallel throughout their entire length.

When a wide board follows a narrow board through edger unit 10, forward section 76 follows saw 16 as before. The trailing section immediately follows the forward section, due to the nonextensibility of chain 116. In this instance, movement of the trailing and forward sections may be simultaneous, since there is nothing that would hinder such movement.

The type of mounting provided by bearing plate 98 is particularly important, as it allows a floating action in the rear end of the picker arm, and should a piece inadvertently become wedged under the arm, the machine may continue to operate until the piece clears itself. By mounting plate 98 on a slight angle, so that its rear end is lower than its forward end, a lifting action results when the forward end of the movable picker arm is moved from a wide to a narrow spacing ahead of the rear end of the arm (due to the angularity then occurring in its intermediate section 78). This may be relied upon to produce a sweeping of plate structure 60, since the rear end of the arm may be lifted and shifted inwardly, with the arm passing over the top of debris on structure 60. The arm lowers when its various sections come into alignment, and on the arm subsequently being shifted to a wide spacing, it moves outwardly in a lowered position with clearing of debris.

Summarizing some of the important features of the invention, it should be noted that boards travel through the apparatus at the same level as the edgings, and without shifting of one below the other, thus to introduce problematical clearance difficulties. Along the length of the apparatus, the picker arm on each side is substantially continuous. The support for the movable picker arm is such that a compact structure results, and the picker arm can be mounted above the rollers that transport the boards.

The apparatus accommodates some delay in the following movement of the trailing section, and for this reason a close spacing of consecutive boards traveling through the apparatus is possible. The picker is entirely adequate in removing the edgings that accompany the board progressing from the edger unit 10. The helical flanges promote clearing of edgings from the top of the apparatus.

While a certain form of the invention has been described, it should be obvious that various changes in the parts and/or their organization are possible, without departing from the invention. It is intended to cover all modifications and variations that would be apparent to one skilled in the art, and that come within the scope of the appended claims.

It is claimed and desired to secure as Letters Patent:

1. In article-handling apparatus, the combination of conveyer means defining a path of travel for articles, an elongated articulated sorter arm extending in the direction of said path and in a position to engage articles moving along said path with division of such articles upon movement relative to said arm, and means mounting said sorter arm accommodating its shifting transversely of said path, said sorter arm including a forward section adjustable to selected positions, a follow-up section disposed to the rear of said forward section, and means including pivot means connecting said follow-up section to a rear portion of said forward section, said means connecting the follow-up section and forward section permitting a delay in the movement of the follow-up section upon the forward section being shifted from the position it has for a wide article to the position it has for a narrow article whereby a wide article yet to clear the follow-up section when the forward section is shifted to the position it has for a narrower article is accommodated by the follow-up section.

2. In article-handling apparatus, the combination of conveyer means defining a path of travel for articles, an elongated articulated sorter arm extending in the direction of said path and in a position to engage articles moving along said path with division of the articles upon movement relative to said arm, and means mounting said sorter arm accommodating its shifting transversely of said path, said sorter arm having a forward section adjacent the feed end of said conveyer means, a pivoted intermediate section pivoted adjacent its forward end to the rear end of said forward section, and a pivoted trailing section pivoted adjacent its forward end to the rear end of said intermediate section.

3. Apparatus for removing edgings from lumber after the same are cut from the lumber comprising conveyer means defining a path of travel for the lumber, an elongated picker arm positioned at least in part over said path and extending in the direction of said path, and means mounting said arm accommodating its shifting transversely of said path, said picker arm having a forward section that is shiftable under power to selected positions in a direction extending transversely of said path, an intermediate section pivotally connected adjacent its forward end to the rear end of said forward section with the rear end of said intermediate section swingable in an arc extending transversely of said path, and a trailing section pivotally connected adjacent its forward end to the rear end of said intermediate section.

4. Apparatus for removing edgings from lumber after the same are cut from the same comprising conveyer means defining a path of travel for the lumber, an elongated picker arm extending in the direction of said path and in position to engage lumber moving along said path with division of the lumber from the edgings, said picker arm comprising an elongated forward section, a mounting for said forward section including guide means constructed to constrain movement of said forward section to substantially lineal movement extending transversely of said path, intermediate and trailing sections pivotally connected adjacent one set of their ends and pivotally connected through said intermediate section to said forward

section, and a mounting for said trailing section accommodating movement of the same in all directions in the plane of said conveyer means.

5. In combination with an edger having a movable saw adjustable in a transverse direction with respect to the travel of boards fed therethrough, conveyer means on the off-bearing side of said edger for transporting lumber along a path of travel proceeding from the edger, and elongated picker means positioned over said path and extending in the direction of said path, said picker means including a forward section adjacent the off-bearing side of said edger and connected to said movable saw for movement in a transverse direction therewith, an intermediate section pivotally connected adjacent its forward end to a rear portion of said forward section, and a trailing section pivotally connected adjacent its forward end to a rear portion of said intermediate section.

6. The combination of claim 5, which further comprises means operatively interconnecting said saw and said trailing section constructed to urge movement of said trailing section upon movement of the saw with such movement being in the direction that the saw moves.

7. The construction of claim 6, wherein the means operatively interconnecting said saw and said trailing section is constructed, upon movement of the saw in one direction, to urge said trailing section in said one direction, while yieldably accommodating movement of the saw in said one direction independently of said trailing section.

8. Apparatus for moving trimmed edgings from lumber after the same are cut from the lumber comprising a frame; a series of power-rotated rollers aligned in a transverse direction and journaled on said frame; means extending between adjacent rollers inhibiting the dropping of material downwardly therebetween; a stationary and a movable picker arm extending over said rollers and spaced laterally apart; said movable picker arm being movable in a lateral direction; said movable picker arm comprising a forward section, an intermediate section pivotally connected adjacent its forward end to the rear end of said forward section, and a trailing section pivotally connected adjacent its forward end to the rear end of said intermediate section; means for moving said forward section laterally relative to said rear section; and substantially helical flange means provided about the perimeter of at least one of said rollers operable on rotation of the roller to produce side shifting of material in a direction extending from said stationary to said movable picker arm.

9. In article handling apparatus, the combination of conveyer means defining a path of travel for articles; fence means extending along said conveyer means defining one side of said path of travel; and mechanism spaced toward the other side of said conveyer means from said fence means defining the other side of said path of travel;

the latter mechanism comprising a forward section, power-operated means for shifting said section transversely of said path to selected positions, an intermediate section pivoted adjacent its forward end to the rear end of said forward section, a rear section pivoted adjacent its forward end to the rear end of said intermediate section, and means connected to said rear section operable upon movement of said forward section toward said fence yieldably to urge the rear section toward said fence; said means connected to said rear section accommodating movement of the forward section toward said fence before movement of said rear section.

10. Apparatus for removing edgings from a board after the same are cut from the board comprising conveyer means defining a path of travel for the board, an elongated laterally movable picker arm positioned over said conveyer means and extending in a direction of said path, said picker arm including a forward portion that is shifted laterally under power, a rear portion movable relative to said forward portion, and means interconnecting said forward and rear portions producing lateral movement in said rear portion upon such movement occurring in said forward portion, said means interconnecting said forward and rear portions including delay means accommodating delay in the movement of said rear portion that follows movement of said forward portion when the latter is shifted from the position it has for a wide board to the position it has for a narrow board.

11. In article-handling apparatus, the combination of conveyer means defining a path of travel for articles; fence means extending along said conveyer means defining one side of said path of travel; and arm mechanism spaced toward the other side of said conveyer means from said fence means defining the other side of said path of travel; said arm mechanism comprising a forward arm section, power-operated means for shifting said forward arm section transversely of said path to selected positions, a rear arm section movable laterally relative to said forward arm section, means interconnecting said forward and said relatively laterally movable rear arm sections, and biasing means connected to said rear arm section operable, upon said forward arm section being shifted towards said fence by said power-operated means, to urge said rear arm section yieldably in the same direction.

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