Aug. 2, 1932. W. D. JOHNSON ET AL 1,869,593

FEEDER FOR WOODWORKING MACHINES

Filed Dec. 11, 1930 3 Sheets-Sheet 1

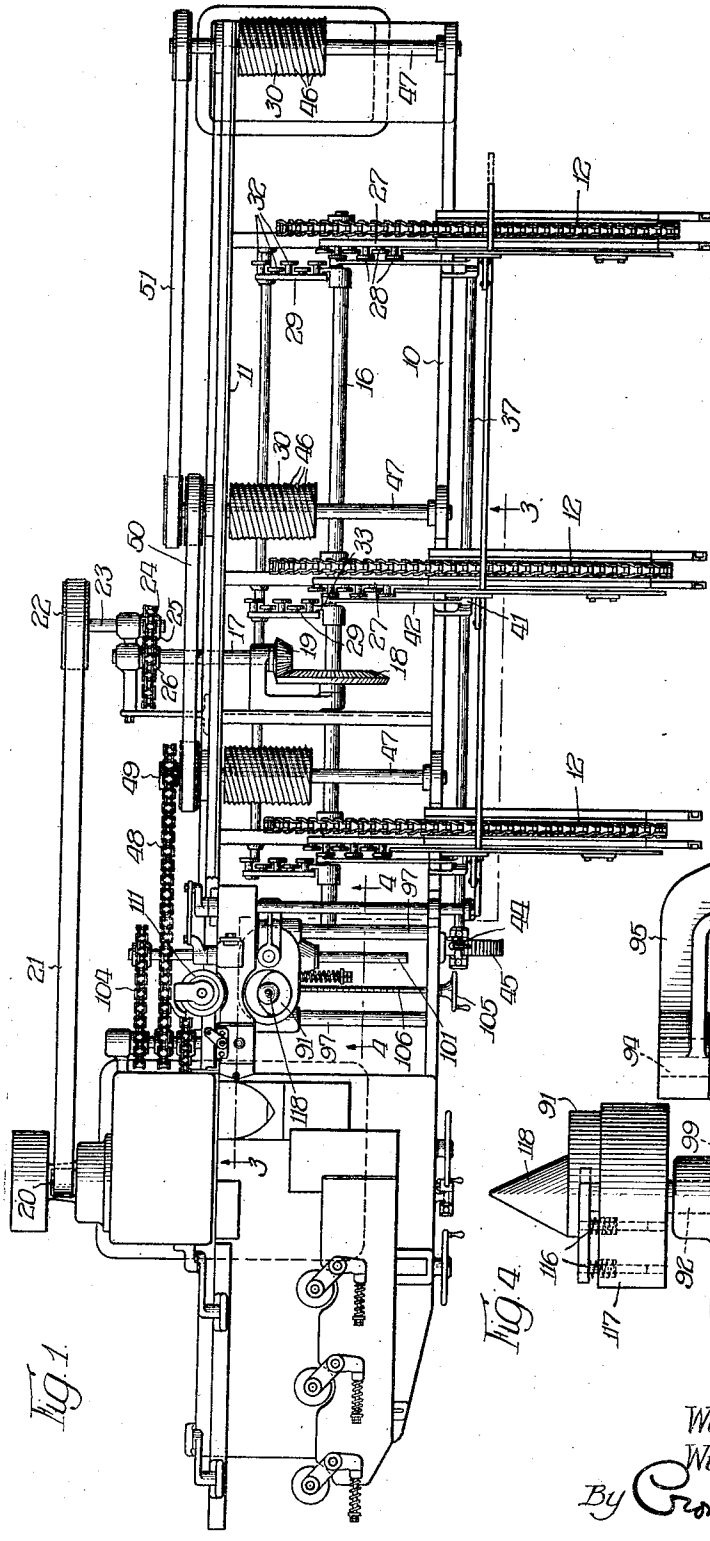


Fig. 1.

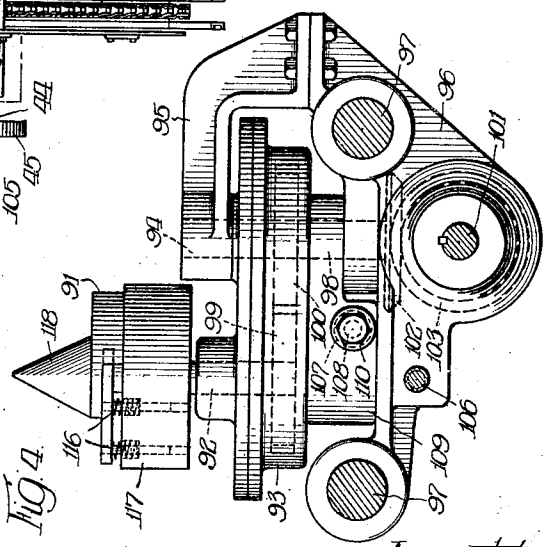


Fig. 4.

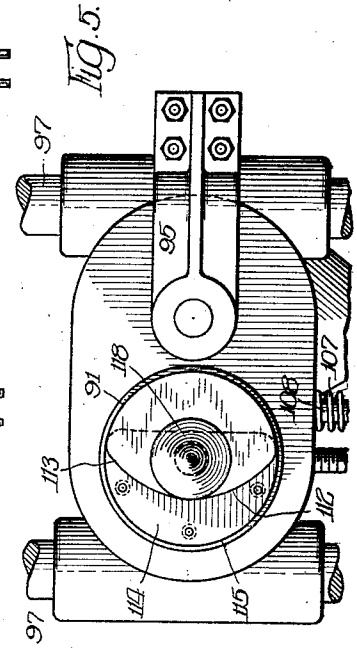


Fig. 5.

Inventors:
Wallace D. Johnson,
Willard L. Hartnell,
By Cromwell, Greist & Warden
Attys

Aug. 2, 1932. W. D. JOHNSON ET AL 1,869,593

FEEDER FOR WOODWORKING MACHINES

Filed Dec. 11, 1930 3 Sheets-Sheet 2

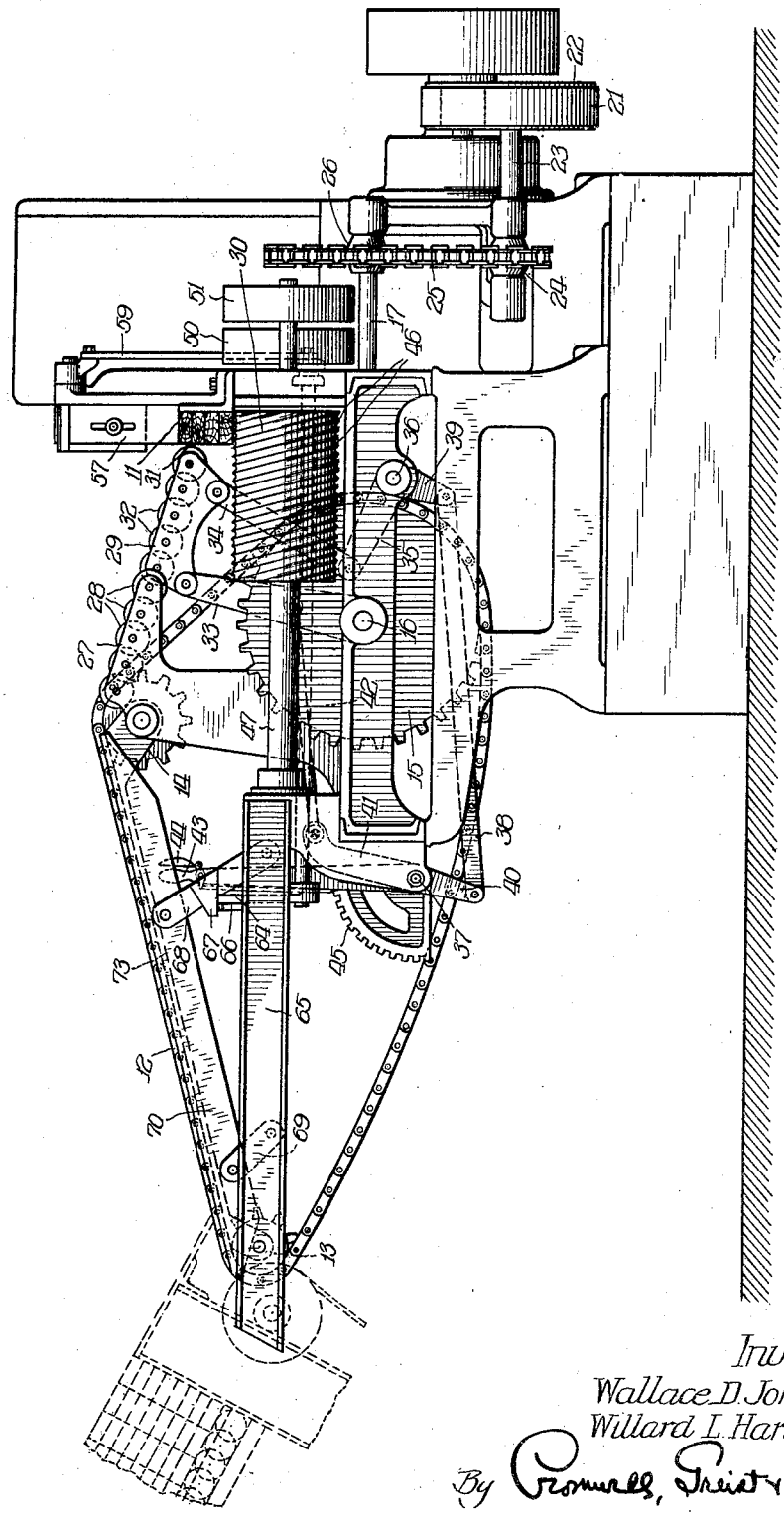


Fig. 2.

Inventors:
Wallace D. Johnson,
Willard L. Hartnell.
By Cromwell, Treist & Warden
Attys.

Aug. 2, 1932. W. D. JOHNSON ET AL 1,869,593

FEEDER FOR WOODWORKING MACHINES

Filed Dec. 11, 1930 3 Sheets-Sheet 3

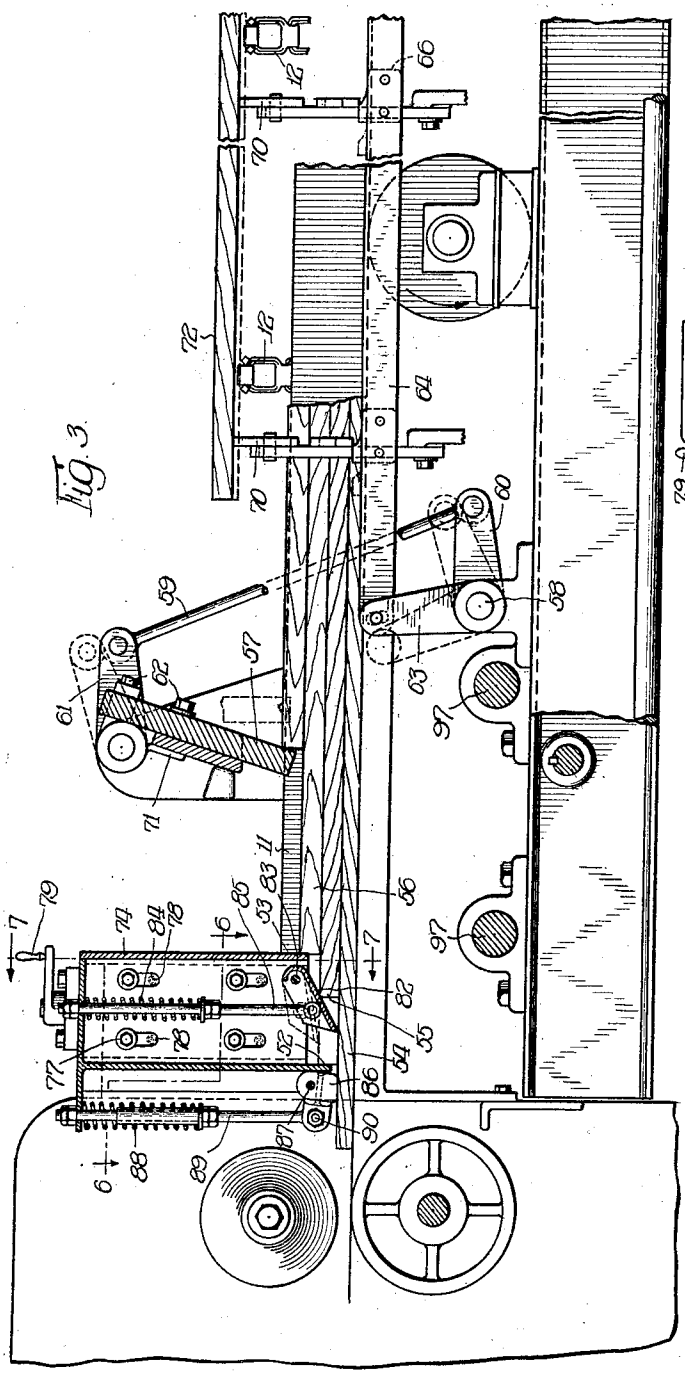


Fig. 3

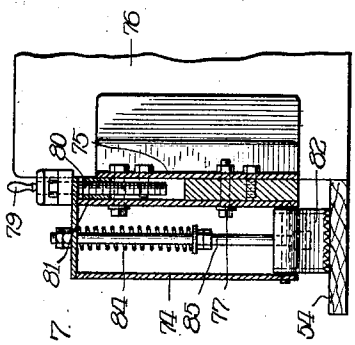


Fig. 7

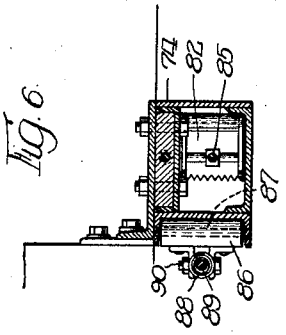


Fig. 6

Inventors:
Wallace D. Johnson,
Willard L. Hartnell,
By Cromwell, Greist & Warden
Attys.

Patented Aug. 2, 1932 1,869,593

UNITED STATES PATENT OFFICE

WALLACE D. JOHNSON, OF BELOIT, WISCONSIN, AND WILLARD L. HARTNELL, OF NEW YORK, N. Y., ASSIGNORS TO YATES-AMERICAN MACHINE COMPANY, OF BELOIT, WISCONSIN, A CORPORATION OF DELAWARE

FEEDER FOR WOODWORKING MACHINES

Application filed December 11, 1930. Serial No. 501,584.

The object of this invention is to provide an improved device for feeding boards into planers and matchers and other woodworking machines.

The device of the invention gives a rapid, positive and accurate feed, will handle wide or narrow boards with equal efficiency, and will not overload should the boards be delivered to the device at a greater rate than they are being fed from the same.

Other more specific objects and advantages of the invention will be apparent to those skilled in the art upon a full understanding of the construction, arrangement and operation of the improved feeding device.

One form of the invention is presented herein by way of illustration, but it will of course be appreciated that the invention is susceptible of embodiment in other structurally modified forms coming equally within the scope of the appended claims.

In the accompanying drawings:

Fig. 1 is a plan view of the feeding device;

Fig. 2 is an end view of the device;

Fig. 3 is a vertical longitudinal section through one portion of the device, taken on the irregular line 3—3 of Fig. 1;

Fig. 4 is a side view of the feeling roll, viewed on the section line 4—4 of Fig. 1;

Fig. 5 is a plan view of the feeding roll;

Fig. 6 is a horizontal section through the housing for the hold-down shoe, taken on the irregular line 6—6 of Fig. 3; and

Fig. 7 is a vertical transverse section through the same housing, taken on the line 7—7 of Fig. 3.

The particular feeding device which is used herein to exemplify the invention includes an elongated frame 10 which is provided at one side with a longitudinally extending guide 11. The frame 10 is adapted to be positioned at the in-feed end of a woodworking machine, with the guide 11 in substantial alignment with the board-receiving instrumentalities of the machine.

The boards which are to be fed into the machine are initially placed on a plurality of upwardly sloping conveyor chains 12, which chains carry the boards upwardly into a position well above the top of the frame. Each of the chains 12 is trained over a small idling sprocket 13 at the lower end of the inclination, a small idling sprocket 14 at the upper end of the inclination and a large driving sprocket 15 beneath the sprocket 14. The driving sprockets 15 of all of the chains are secured to a longitudinally extending shaft 16 which is driven from a transversely extending countershaft 17 through intermeshing bevel gears 18 and 19 on the shafts. The shaft 17 is in turn driven from a power pulley 20 through a belt 21, a pulley 22 on a shaft 23, a sprocket 24 on the shaft 23, a chain 25 and a sprocket 26 on the shaft 17.

When the boards, in traveling upwardly on the conveyor chains 12, reach the top of their travel, they are transferred one at a time onto a plurality of downwardly sloping slide ways 27 which are surfaced by a series of anti-friction rollers 28. The boards slide rapidly down the ways 27 onto slightly offset adjustably positioned extension ways 29 and drop from the lower ends of the ways 29 onto a plurality of transversely extending rolls 30. The lower ends of the ways 29 are spaced from the guide 11 only far enough to let the boards drop therebetween with a little clearance, with the result that, when the boards reach the rolls 30, they assume positions substantially in contact with the guide 11 and will stack up on each other against the face of the guide, as clearly shown at 31 in Fig. 2.

The extension slide ways 29 are surfaced, like the ways 27, with series of anti-friction rollers 32 and are pivotally attached at their upper and lower ends respectively to the upper ends of links 33 and 34. The links 33 are all pivotally mounted at their lower ends on the shaft 16, while the links 34 are all pivotally attached at their lower ends to the outer ends of arms 35 which are secured to a longitudinally extending rock shaft 36. The shaft 36 is connected with a longitudinally extending control shaft 37 by a link 38 which is pivoted at one end to an arm 39 on the shaft 36 and is pivoted at the other end to an arm 40 on the shaft 37. The shaft 37 is provided with a plurality of arms 41 which are connected with the links 33 by

links 42. The shaft 37 is oscillated in one direction or the other by a hand lever 43 which is attached to one end of the shaft and is provided with a releasable hand latch 44 for coaction with a locking segment 45.

When the lever 43 is moved in one direction, the extension ways 29 will be retracted from the guide 11 into lapped relation with the ways 27, through the action of the links 33 and 34, and, when the lever is moved in the other direction, the extension ways 29 will be advanced toward the guide 11 to form continuations of the ways 27. The particular setting of the ways 29 is of course determined from the width of the boards which are to be fed.

The rolls 30, onto which the boards drop from the extension ways 29, are provided on their peripheries with helical traction ribs 46 which serve to move the boards forwardly along the guide 11 and at the same time force the boards snugly against the guide. The rolls 30 are mounted on transversely extending shafts 47. The first one of the shafts 47 is driven by a chain 48 which is trained over a sprocket 49 on the shaft; the second is driven from the first by a pulley-and-belt connection 50; while the third is driven from the second by a similar pulley-and-belt connection 51.

If the boards are deposited on the rolls 30 faster than they are being removed therefrom by the instrumentality hereinafter described, they will stack up, and all of the boards in the stack, with the exception of the lowermost board 54, will be prevented from moving forwardly along the guide beyond a certain point by two stepped stops 52 and 53 at the far end of the guide, which stops are clearly shown in Fig. 3. The second board 55 from the bottom will come to rest against the stop 52, while the third board 56 from the bottom, together with any boards which may be resting thereon, will come to rest against the stop 53.

Should the boards stack up too rapidly, one of the uppermost boards in the stack, in moving forwardly along the guide 11, will engage with the lower free end of a pivoted finger 57 and will move the latter. When the finger 57 is moved in the direction of travel of the stacked boards, it will impart a corresponding movement to a transversely extending shaft 58, which shaft is connected with the finger by a link 59 which is attached at one end to an arm 60 on the shaft and at the other end to an arm 61 on the finger. The finger 57 is preferably made in two sections which are clamped together by bolts 62 and may be extended if desired to increase the length of the finger. The shaft 58 is provided with an arm 63 which is pivotally attached to one end of a longitudinally extending bar 64. The bar 64 is slidably supported on a plurality of transversely extending portions 65 of the frame and is provided with a plurality of tapering plates 66 which are adapted to wedge under shoulders 67 formed on links 68. The links 68, together with shorter parallel links 69, are pivotally attached at their lower ends to the laterally projecting portions 65 of the frame and are pivotally attached at their upper ends to a plurality of straight-edged blades 70. The blades 70 are arranged alongside the upwardly sloping top stretches of the chains 12, at the same inclination as the chains, in positions slightly below the latter, and are adapted to be raised a little above the chains by the movement of the finger 57.

When the blades 70 are raised above the chains 12, the boards traveling upwardly on the chains will be lifted clear of the latter and will not advance toward the slide ways 27 and 29 and the guides 11 until after the finger 57 has returned to its normal downwardly projecting position under the influence of a return spring 71. In Fig. 3 the lifting blades 70 are shown in their elevated positions with a board 72 thereon free of the chains 12. The upper stretches of the chains 12 are prevented from sagging toward the blades 70 when the latter are lowered by strips 73 which are positioned directly beneath the chains.

The stops 52 and 53, which serve to temporarily arrest all but the lowermost board, are formed on the lower front and rear walls respectively of a rectangular open-bottomed casing 74, which casing is attached above the guide 11 to a bracket 75 on a vertically extending portion 76 of the frame 10. The casing 74 is fastened to the bracket 75 by a plurality of bolts 77 which extend through vertically elongated slots 78 in one side of the casing, thus permitting the position of the casing to be adjusted vertically to handle boards of different thicknesses. For convenience in adjusting the casing, the latter is provided with a hand crank 79 which operates a screw 80 in threaded engagement with a sleeve 81 carried by the bracket 75.

When the lowermost board 54 in the stack is fed out from beneath the other boards, the board which was until then the second board from the bottom in engagement with the stop 52 is forced downwardly into a position clear of the stop by means of a pressure shoe 82. The shoe 82 is located within the open bottom of the casing 75 between the stops 52 and 53, and is pivotally attached to the casing at 83. The lower free front end of the shoe is serrated and is pressed downwardly into engagement with the underlying board by the action of a coil spring 84 which is compressed on a rod 85 attached to the shoe.

Since the boards which are fed by the device vary somewhat in thickness, even though supposedly of the same thickness, the first stop 52, if positioned high enough to always clear the lowermost board, is also like-

ly to clear the second board as well if the boards happen to be unusually thin. In order to arrest the second board under such circumstances, a supplemental stop 86 is located a short distance beyond the stop 52. The stop 86 consists of a block which is pivoted to the casing 74 at 87 and is normally maintained in a substantially upright position by a compressed coil spring 88 which encompasses a rod 89. The rod 89 is pivotally attached to the block 86 at 90, a short distance in front the pivot 87. The stop 86 will prevent the second board from moving past the same but will rock forwardly under spring resistance to permit the lowermost board to pass thereunder, even though the board happens to be unusually thick, when the latter is positively advanced by the means hereinafter described.

The means for positively moving the lowermost board forwardly beneath the front stops 52 and 86 consists of a vertical feed roll 91 of special construction which is adapted to engage with the edge of the lowermost board opposite the guide 11. The feed roll 91 is attached to the upper end of a vertical spindle 92 which is journaled in a gear housing 93. The housing 93 is pivoted at 94 to an overhanging arm 95 on a slide 96, and the slide 96 is shiftably mounted on two transversely extending guide rods 97. The spindle 92 is rotated from a vertical countershaft 98 within the housing by a spur gear 99 on the spindle which meshes with a spur gear 100 on the countershaft. The countershaft 98, which is co-incident with the pivotal axis of the housing 93, is rotated from a horizontal transversely extending shaft 101 by a bevel gear 102 on the countershaft which meshes with a bevel gear 103 which is shiftably splined on the shaft 101. The shaft 101 is driven by a chain-and-sprocket connection 104. The slide 96 may be advanced or retracted with respect to the guide 11 by means of a hand wheel 105 which is attached to one end of a long transversely extending screw 106. One end of the screw 106 is in threaded engagement with the slide 96, while the other end is journaled in the frame 10 in axially stationary relation thereto. Pivotal movement of the housing 93 with respect to the slide 96 in a direction away from the guide 11 is yieldingly resisted by a coil spring 107 which is positioned on a rod 108. The rod 108 is attached to the slide and projects through an aperture in a flange 109 on the bottom of the housing. The spring 107 is compressed between the flange 109 and an enlargement 110 on the end of the rod.

The feed roll 91 is positioned near the front end of the frame in opposition to an anti-friction roll 111. The roll 111 projects peripherally a slight distance beyond the face of the guide 11 and engages with the far edge of the board which is being fed by the roll 91.

The feed roll 91 is concentric with the axis of the spindle 92 throughout a portion only of its periphery. The remaining portion 112 of its periphery is eccentric to the axis of the spindle, being set inwardly to produce a curved cam section 113. The relieved portion 112 of the periphery is filled out, however, by means of an upwardly spring-pressed plate 114, which plate has a curved periphery which is concentric with the axis of the spindle 92 and forms a continuation of the concentric portion of the periphery of the roll 91. The plate 114 is adapted to yield downwardly against the resistance of a plurality of supporting springs 116. The roll 91 and the pressure springs 116 are carried by a circular base member 117. The roll 91 is provided, directly above the axis of the spindle 92, with a cone-shaped tip 118 which merges at its base into the center of the relieved portion 112 of the periphery of the roll.

The portions of the peripheries of the roll 91 and plate 114 which are concentric with the axis of the spindle constitute a continuous circular board-feeding surface. The relieved portion 112 of the periphery of the roll 91 provides sufficient clearance to receive the second board in the stack after the lowermost board has been fed out. If such a relieved portion were not provided, the second board, in dropping into the position previously occupied by the first, would overlap the edge of the inwardly spring-pressed roll and the latter would be unable to engage with the edge of the board. If the board is unusually wide, or happens to be spaced from the guide 11 for some reason, the cone-shaped tube 118 will guide the edge of the board into the relieved portion 112. When the board drops into the relieved portion 112, it will force the resiliently yieldable plate 114 downwardly far enough to permit the board to rest flatly upon the rolls 30. During the first revolution of the feed roll 91 following the dropping of the board, the cam 113 on the roll will force the latter back into normal feeding position, and the plate 114, upon turning out from under the board, will spring up and form with the roll 91 an uninterrupted circular feeding surface. By reason of the special construction described, the feeding roll 91 never requires more than a single revolution of the same in which to adjust itself to a board and commence the feeding operation.

The operation of the machine, briefly summarized, is as follows:

The boards are placed on the upwardly moving conveyor chains 12 and discharged by the chains onto the slideways 27. From the slideways 27, the boards drop onto the rolls 30 against the guide 11. Ordinarily,

the boards will stack up upon each other against the guide. The lowermost board in the stack will be engaged by the fed roll 91 and fed forwardly, while the remaining boards in the stack will be arrested by the stops 52 and 53 and will successively assume the position of the lowermost board. The feed roll 91 will automatically adjust itself to each board in turn, feeding the boards forwardly one at a time at a constant rate of speed. Should the boards be received on the conveyor chains 12 faster than they are being fed out by the roll 91, they will of course stack up more and more against the guide 11. After the stack has reached a predetermined height, however, the conveyor chains 12 will be automatically thrown out of operation by the action of the blades 70. As soon as the stack of boards against the guide has been reduced in height, the chains 12 will automatically go back into operation.

We claim:

1. In a device for feeding boards endwise into an associated woodworking machine, means for forming the boards into a stack, means for feeding the lowermost board endwise out from under the stack, and means for automatically suspending the operation of the stack-forming means when the stack reaches a certain height.

2. In a device for feeding boards endwise into an associated woodworking machine, a guide, means for placing boards against the guide, means for feeding the boards endwise one at a time along the guide, and automatically actuated means for preventing the first mentioned means from overloading the second mentioned means.

3. In a device for feeding boards endwise into an associated woodworking machine, a longitudinally extending guide, a transversely extending conveyor, a transversely extending slideway between the conveyor and the guide in spaced relation to the latter for receiving boards from the conveyor and depositing them against the guide, and a feed roll in spaced relation to the guide for feeding forwardly one at a time the boards deposited against the guide; said feed roll having a relieved peripheral section, a resiliently yieldable peripheral section which normally fills out the relieved section to provide an uninterrupted circular feeding periphery for the roll, and a cone-shaped tip which will direct a raised board downwardly onto the yieldable section.

4. In a device for feeding boards endwise into an associated woodworking machine, means for forming the boards into a stack, and a feed roll for moving the lowermost board endwise out from under the stack; said roll having a relieved peripheral section, a resiliently yieldable peripheral section which normally fills out the relieved section to provide an uninterrupted circular feeding periphery for the roll, and a cone-shaped tip which will direct a raised board downwardly onto the yieldable section.

6. In a device for feeding boards endwise into an associated woodworking machine, means for forming the boards into a stack, and a feed roll for moving the lowermost board endwise out from under the stack; said roll having a relieved peripheral section into opposition with which each board is intended to move before being engaged by the roll, and a cone-shaped tip on the roll which is coextensive at its base with the relieved section for directing an overlapping board downwardly and laterally into opposition to the relieved section.

6. In a device for feeding boards endwise into an associated woodworking machine, a vertical longitudinally extending guide, a transversely extending conveyor for moving a board laterally into a position against the guide, a plurality of horizontal feed rolls for advancing the board along the guide, a vertical feed roll in opposition to the guide for receiving the board from the horizontal feed rolls, and means for lifting boards on the conveyor into positions clear of the latter whereby to interrupt the conveying operation.

7. In a device for feeding boards endwise into an associated woodworking machine, a vertical longitudinally extending guide, a transversely extending conveyor for moving a board laterally into a position against the guide, a plurality of horizontal feed rolls for advancing the board along the guide, a vertical feed roll in opposition to the guide for receiving the board from the horizontal feed rolls, means for lifting boards on the conveyor into positions clear of the latter, whereby to interrupt the conveying operation, and means for automatically actuating said last-mentioned means when the stack of boards against the guide exceeds a predetermined height.

8. In a device for feeding boards endwise into an associated woodworking machine, a longitudinally extending guide a transversely extending conveyor, a transversely extending slideway sloping downwardly from the conveyor toward the guide in spaced relation to the latter for receiving boards from the conveyor and sliding them into positions against the guide, a feed roll in spaced relation to the guide for feeding forwardly one at a time the boards deposited against the guide, and means for adjusting the position of the slideway toward or away from the guide without disturbing the receiving relationship of the slideway to the conveyor.

9. In a device for feeding boards endwise into an associated woodworking machine, a longitudinally extending guide, a transversely extending conveyor, a transversely

extending slideway sloping downwardly from the conveyor toward the guide in spaced relation to the latter for receiving boards from the conveyor and sliding them into positions against the guide, and a feed roll in spaced relation to the guide for feeding forwardly one at a time the boards deposited against the guide; said slideway being characterized by a stationary section, a movable section in lapped extensible relation to the stationary section, and means for adjusting the position of the movable section with respect to the stationary section.

In testimony whereof we have hereunto subscribed our names.

WALLACE D. JOHNSON.
WILLARD L. HARTNELL.