April 30, 1963 O. G. JEDDELOH 3,087,597

UNLOADING MECHANISM FOR SHEET-HANDLING MULTIDECK CONVEYER

Filed Aug. 22, 1960 3 Sheets-Sheet 1

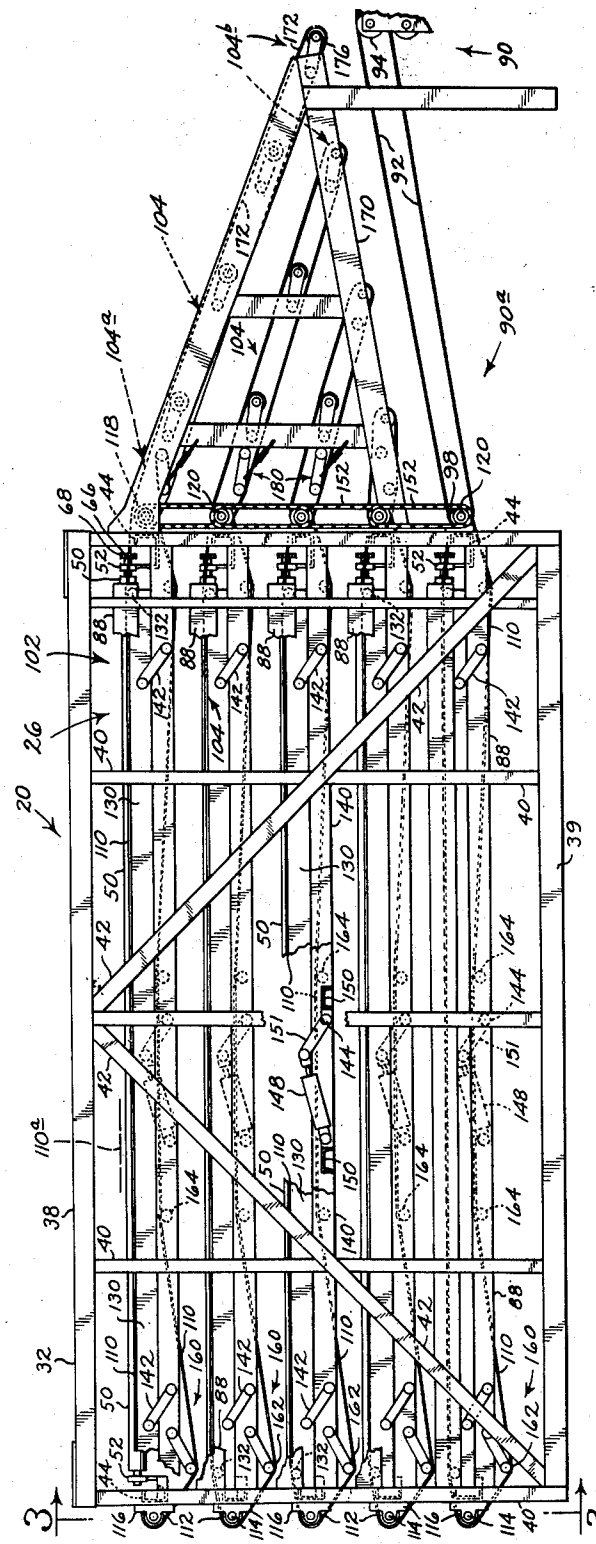


Fig. 1.

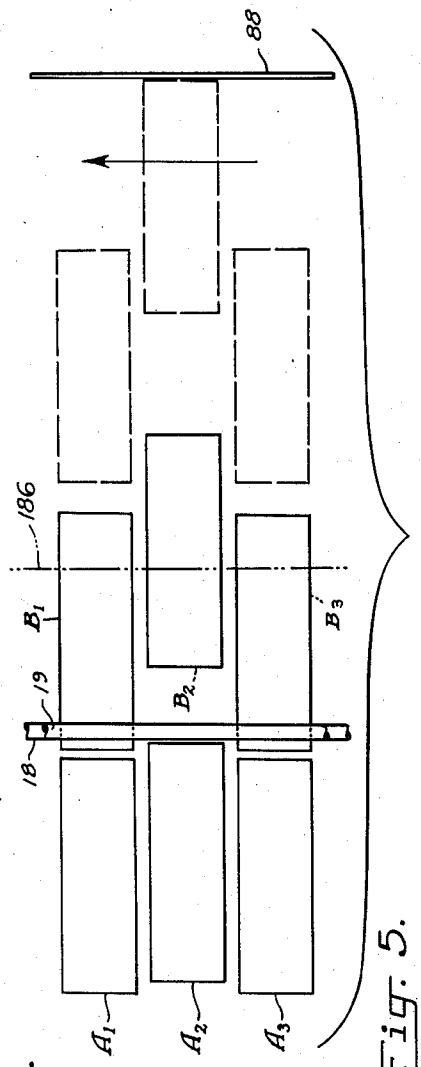


Fig. 5.

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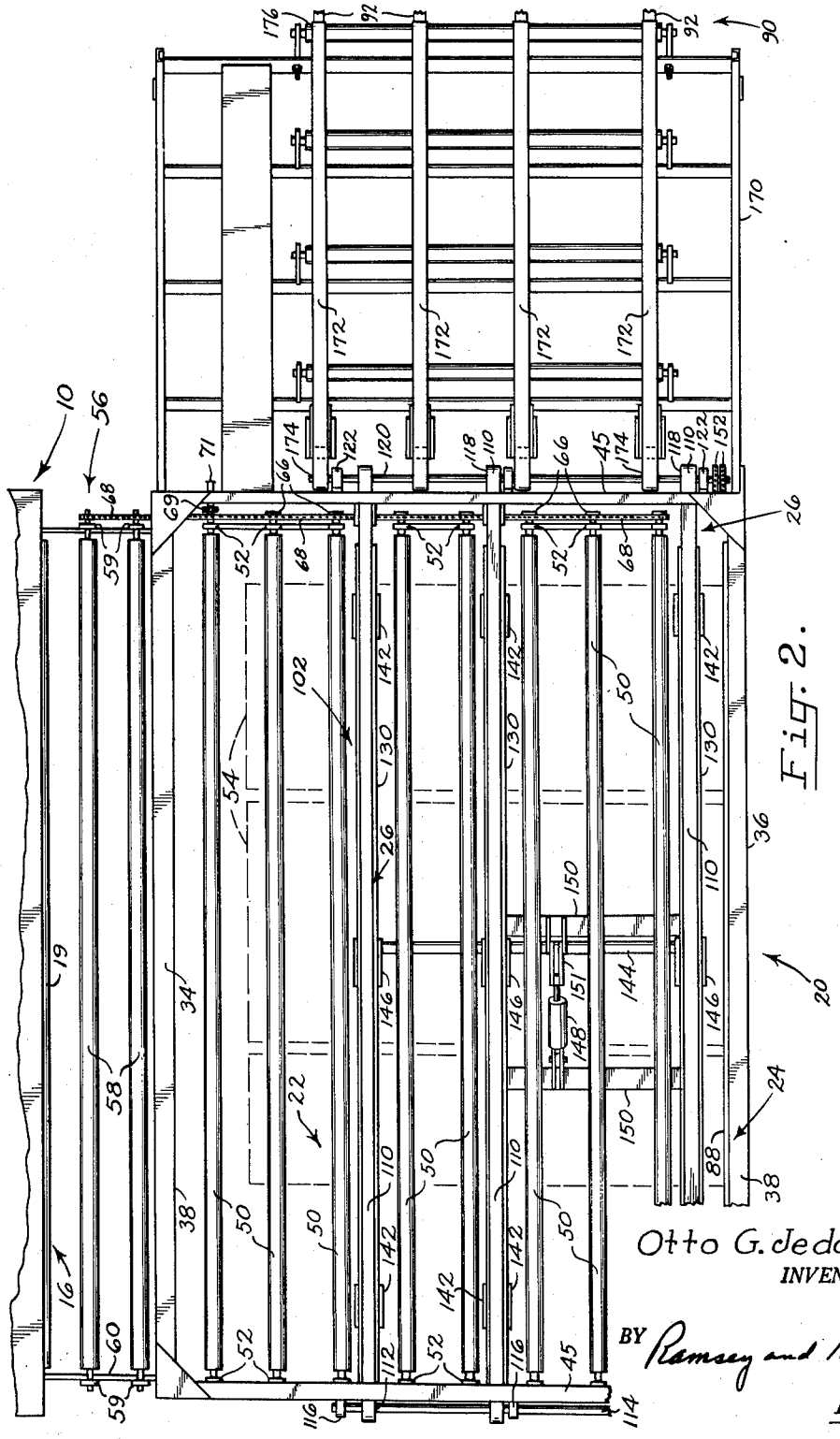


Fig. 2.

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UNLOADING MECHANISM FOR SHEET-HANDLING MULTIDECK CONVEYER

Filed Aug. 22, 1960 3 Sheets-Sheet 3

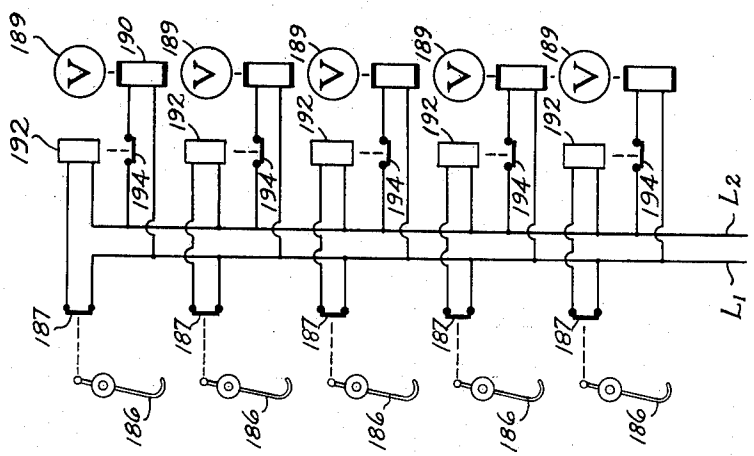


Fig. 4.

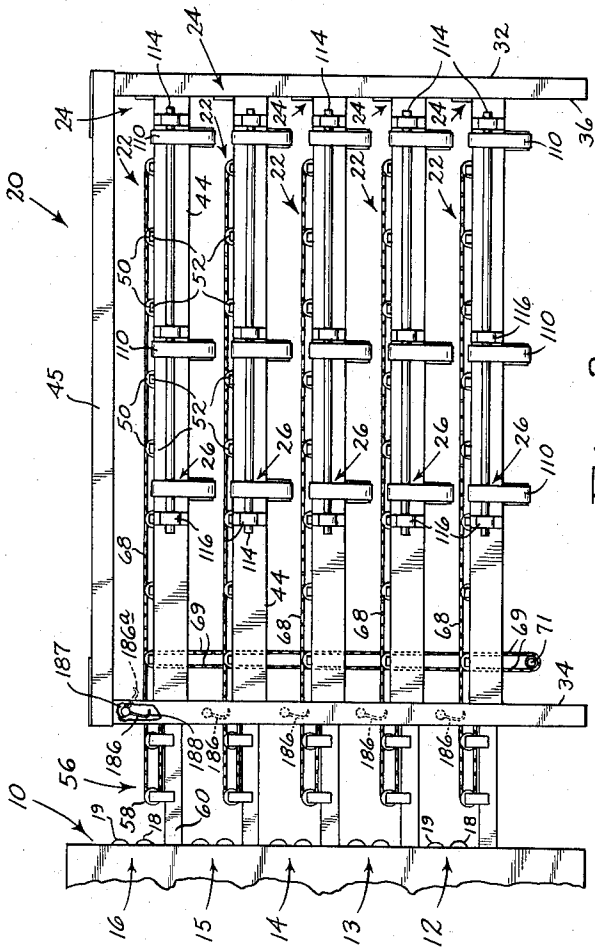


Fig. 3.

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Patented Apr. 30, 1963

3,087,597

UNLOADING MECHANISM FOR SHEET-HANDLING MULTIDECK CONVEYER

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Filed Aug. 22, 1960, Ser. No. 50,994
12 Claims. (Cl. 198—32)

This invention relates to an unloader for a multideck, sheet-handling conveyor. More particularly, this invention relates to unloading mechanism for unloading sheets from a sheet-handling multideck conveyor that operates to take the sheets and deposit them on an off-bearing conveyor with the sheets arranged in an orderly manner and without skewing, overlapping edges, bunching, etc. The invention is described hereinbelow in connection with the unloading of a veneer dryer, where the unloading of veneer sheets from the decks of a dryer onto a so-called "dry chain" or off-bearing conveyer has been a serious problem.

One general object of the invention is to provide an improved unloading mechanism that occupies relatively little room, but that is nevertheless able to perform its unloading and depositing function in a highly practical and satisfactory manner. The compact construction of the unloader is particularly significant, when it is remembered that the usual dryer is a relatively long piece of equipment, and space considerations are very important.

Another general object is to provide an unloader for a multideck conveyer, such as a dryer, that functions to deposit sheets in the approximately side by side position they have in a dryer on an off-bearing conveyer, whereby the sheets may most easily be subjected to such operations as sorting, testing for moisture, etc., on the off-bearing conveyer.

A further general object is to provide an unloader where its sequence of operation is regulated in a novel manner by the sheets handled by the unloader. The unloader automatically adjusts itself to sheets of different length, and different speeds of the multideck conveyer feeding it.

The usual veneer dryer has plural, stacked, conveyer decks, typically four or five, and veneer sheets travel through the dryer on these decks at relatively slow speeds, so that between the time that a sheet is fed into and leaves the dryer, its moisture content is suitably reduced. The feeding of sheets to the various decks at the feed end of the dryer is staggered. That is to say, first one deck is fed a charge or group of sheets (the sheets of the group lying side by side), with the lead and trailing ends of the sheets in substantial alignment in a direction extending transversely of the dryer; and then, one after another, the remaining decks are fed with similarly aligned sheets, but with the sheets in the charge fed each successive deck occupying a position somewhat behind the sheets in the charge fed the deck fed immediately previously. Thus, after a charge of sheets has been fed to the last deck of the dryer, the deck first fed is in condition to receive a new charge of sheets, and the decks can be fed recurrently, with substantially continuous operation of the feeder. The dryer decks convey sheets at a common speed, and as a result there is a staggered discharge of sheets from the various decks at the dryer's discharge end.

It is conventional to deposit sheets leaving a dryer on a "dry chain," or off-bearing conveyer, where the sheets can be sorted, tested for moisture, etc. Space consideration and other factors indicate the use of a common off-bearing conveyer for the plural decks of a dryer, and such an off-bearing conveyer usually extends in a lateral direction to one side of the dryer. This positioning of the

conveyer reduces the overall length of the equipment, and enables sheets to be placed on the off-bearing conveyer with their long dimension extending transversely of the conveyer (sheets usually travel lengthwise through a dryer).

Difficulties have been encountered in removing sheets from a dryer and placing them on the dry chain without the sheets bunching and skewing. A conventional construction has employed an unloading conveyer at the discharge end of a dryer, positioned below the dryer decks so that sheets fall on it on discharge from the dryer. Such a conveyer rapidly transports sheets forwardly (so that the conveyer may clear itself to receive additional sheets falling thereon), and throws sheets lengthwise onto the dry chain, which receives the sheets on the fly and immediately imparts lateral motion to the sheets. The abrupt change in the direction that the sheets travel, and the throwing of the sheets, produce skewing and overlapping. Also a factor in the disorderly arrangement of the sheets on the dry chain is the fact that a slight variation in the time that the trailing end of a pair of side by side sheets leave a dryer produces a substantial variation in the relative position of the two sheets on the unloading conveyer. Since the unloading conveyer moves sheets at a substantially faster speed than the speed of the sheets in the dryer, a sheet leaving the dryer two inches ahead of an adjacent sheet travels far to the front of the adjacent sheet before reaching the dry chain. This change in position on the unloading conveyer between the adjacent sheets of any given deck, and the fact that multiple decks feed onto the unloading conveyer, produce random bunching on the dry chain that makes testing for moisture and similar processing of the sheets on the dry chain almost impossible.

A feature and more specific object of this invention is the provision of unloading mechanism which comprises a speed-up conveyer section for each deck in a dryer, that moves sheets forwardly from the dryer at an accelerated speed, and positioning means operable to stop and position the lead ends of sheets so that these ends are aligned after they have left the dryer. The unloading mechanism also is provided with clearing conveyer mechanism for shifting sheets laterally from the speed-up conveyer sections after the sheets are stopped. A clearing conveyer mechanism is provided each speed-up conveyer section, and the mechanism moves sheets off the conveyer section in substantially the relative position that they have after end alignment on the speed-up conveyer section (which is substantially the same relative position they have on entering the dryer). Collecting sheets from the various clearing conveyer mechanisms is an off-bearing conveyer extending laterally of the direction of travel of sheets through the dryer. Using the construction just described, sheets may be collected on the off-bearing conveyer with the sheets following one another in an orderly fashion, and with substantially no overlapping or bunching of sheets.

Another object is to provide unloading mechanism for a multideck conveyer having a speed-up conveyer section and a clearing conveyer mechanism for each deck, that readily handles the discharge from a multideck conveyer where the feed of sheets to the decks of the multideck conveyer is staggered, and that can unload such sheets with unloading occurring from successive decks in the same order that successive decks were fed at the feed end of the multideck conveyer.

A further object of the invention is to provide an unloader with speed-up conveyer sections that includes novel control means having a detector for each speed-up conveyer section, that detects the presence or absence of sheets traveling through a control zone for the detector

and into a conveyer section, and that initiates clearing of sheets from the speed-up conveyer section at a time determined by the travel of sheets beyond the detector.

More specifically, it is an object of the invention to provide a novel control system as above that includes a detector of the type described and time delay mechanism constructed, so that with sheets traveling into a speed-up conveyer section, mechanism for clearing the conveyer section is in an inoperative position, and constructed to adjust such clearing mechanism to an operative position a predetermined time interval after sheets leave the control zone of the detector.

Another object is to provide a novel unloader and control therefor that is easy to service and to maintain in operating condition, and relatively simple in operating concept and construction.

Other features, objects, and advantages are attained by the invention, and the same is described hereinbelow in conjunction with the accompanying drawings, wherein:

FIG. 1 is an elevation looking toward the side of unloading apparatus or mechanism constructed according to the invention (such extending transversely across the end of a multideck conveyer such as a dryer), showing the ends of plural speed-up conveyer sections that extend to the front of the decks of the multideck conveyer, and showing the side of five clearing conveyer mechanisms, each operable in an operative position to shift sheets from left to right in the figure and onto an off-bearing conveyer extending to the right of the figure;

FIG. 2 is a plan view of the unloading mechanism illustrated in FIG. 1;

FIG. 3 is an elevation taken along the line 3—3 in FIG. 1, showing one set of sides of the speed-up conveyer sections and one set of ends of the clearing conveyer mechanisms;

FIG. 4 is a schematic drawing showing a control system for the unloading mechanism; and

FIG. 5 is a simplified drawing showing how sheets are conveyed through a dryer and then handled by the unloading mechanism.

Referring now to the drawings (FIG. 3), **10** indicates generally the discharge end of a conventional dryer. The dryer has five decks, indicated at **12–16**. Each deck may take the form of a series of smooth-surfaced bottom rolls, such as the rolls **18** shown partially in FIG. 3, that extend transversely of the dryer and follow one another along the length of the dryer. A top roll, such as top roll **19**, may be provided above certain of the bottom rolls, and this top roll clamps veneer traveling through the dryer down on the bottom rolls. The bottom rolls are rotated under power (by suitable means not shown), so that they are operable to move veneer sheets from the feed to the discharge end of the dryer, and the veneer travels through the dryer at a relatively slow speed that typically may range from five to twenty feet per minute. While the entire dryer is not illustrated, as is well known to those familiar with the art, typically the dryer is a long piece of equipment taking a considerable amount of room.

Again with reference to conventional practice, veneer may be fed to the dryer using a feeder that feeds successively charges of plural sheets to different dryer decks and that staggers the charges fed to successive decks. Veneer sheets travel lengthwise through the dryer, with charges or groups of sheets containing typically from three to six sheets disposed side by side, the exact number of sheets depending on the width of the sheets and the width of the dryer. The feeder inserts the sheets with leading and trailing ends of the sheets approximately aligned transversely of the path of travel through the dryer. A dryer feeder constructed to perform the feeding operation just explained is more fully disclosed in U.S. Reissue Patent No. 24,843, issued on July 12, 1960, and reference is made to that patent for a disclosure of such a feeder.

Referring again to the drawings, unloading mechanism for the dryer is mounted forwardly of discharge end **10**, and is indicated in the drawings generally at **20**. The unloading mechanism is provided with a speed-up conveyer section **22** for each deck of the dryer, for moving sheets rapidly from discharge end **10**, positioning means **24** for stopping and positioning the forward or lead ends of such sheets on each speed-up conveyer section, and clearing conveyer mechanism **26** for then shifting sheets laterally and onto an off-bearing conveyer, all as will be described more completely hereinbelow.

Specifically, a frame for the unloading conveyer mechanism is indicated at **32**. In the embodiment of the invention illustrated, frame **32** includes spaced apart frame sections **34, 36** (see FIG. 3), each having an elongated top and bottom frame member **38, 39**, respectively, interconnected by uprights **40** (see FIG. 1). Bracing each frame section are braces **42**. Frame sections **34, 36** themselves are interconnected by transversely extending beams **44** (see FIG. 3) and members **45**. In this manner, the frame sections, members, and beams together define a skeletal type of frame, substantially rectangular in outline.

Considering now the construction of speed-up conveyer sections **22**, each of these comprises a series of elongated smooth-surfaced steel rolls **50** disposed in front of a deck of the dryer and extending transversely of the path of sheets in the dryer. The upper surfaces of these rolls define a support plane for veneer sheets that is substantially horizontal and that is a continuation of the support plane of the deck that feeds the conveyer section. The rolls of a speed-up conveyer section transport sheets forwardly in a path that is an extension of the path defined by a dryer deck. The rolls may be mounted on frame **32** in any suitable manner. In the embodiment illustrated, the rolls have ends journaled in bearings **52** supported on horizontal beams **44**.

Also a part of each speed-up conveyer section in the embodiment of the invention shown is a roll bridge **56** for each deck that bridges a space between the discharge end of the dryer and the rolls mounted on frame **32**. Each roll bridge comprises smooth-surfaced steel rolls **58** parallel to rolls **50** journaled in bearings **59** supported on stub beams **60** extending toward the dryer from frame **32** of the unloading mechanism.

As already mentioned, the function of each speed-up conveyer section is to move sheets rapidly from the discharge end of the dryer. Each section thus is made large enough to support sheets with the sheets all the way out of the dryer and the trailing ends of the sheets clear of discharge end **10**. Veneer sheets arrange themselves on the speed-up conveyer sections generally in the manner illustrated by the sheets **54** shown in dashed outline in FIG. 2.

Power-actuated mechanism is provided for rotating rolls **50, 58** at a speed substantially faster than the speed of rotation of the rolls **18, 19** in the dryer. Thus, rolls **50, 58** of each speed-up conveyer section have attached to one set of ends sprockets **66**. Trained over the sprockets **66** of the rolls in each conveyer section is a chain **68**. The chains **68** of the various conveyer sections are interconnected by coupling chains **69**. The coupling chains receive their drive from a drive shaft **71** and a motor (not shown). In the usual installation, the rolls of the speed-up conveyer sections are driven at a speed that produces movement in veneer deposited thereon that is some four to six times faster then the rate of travel of veneer through the dryer.

Means **24** for stopping veneer sheets and positioning their forward set of ends is located at the forward end of each speed-up conveyer section, i.e., adjacent the bottom of the page in FIG. 2. Each means **24** may take the form of an elongated, narrow plate **88**, fastened in fixed position on the frame and projecting above the level of the support plane defined by the rolls **50** of a

speed-up conveyer section. Each plate **88** positions the forward set of ends of veneer sheets on a speed-up conveyer section by aligning the ends in a direction extending transversely of the path of travel of veneer in the dryer.

The usual practice in a plywood plant is to deposit sheets leaving a dryer on a "dry chain" or off-bearing conveyer, with the sheets lying across the conveyer, and moved by the conveyer in a direction extending transversely of their length. The conveyer is positioned so that it extends to one side of the length of the dryer. In this position sheets are most easily placed in proper position on the off-bearing conveyer, and the overall length of the dryer is not increased substantially. Such an off-bearing conveyer is indicated in FIG. 1 at **90**. The conveyer comprises elognated belts **92** trained over pulleys, such as pulleys **94**. In the embodiment of the invention illustrated, veneer on the bottommost speed-up conveyer section is removed from the conveyer section and deposited directly on the off-bearing conveyer. Thus, and again with reference to FIG. 1, end **90***a* of the off-bearing conveyer extends downwardly adjacent the bottommost speed-up conveyer section, with belts **92** of the conveyer trained over terminal pulleys **98**.

Clearing conveyer mechanism **26** for each speed-up conveyer section is operable, when actuated, to shift sheets laterally from the speed-up conveyer section in substantially the position the sheets have after positioning by plate **88**, and deposit them on the off-bearing conveyer. In the form of the invention shown, the clearing conveyer mechanism for each of the top four speed-up conveyer sections comprises a jump or removing conveyer portion **102**, and a transport conveyer portion **104** that transfers sheets from the jump conveyer portion onto the off-bearing conveyer **90**. Since the bottommost speed-up conveyer section is directly adjacent the feed end of off-bearing conveyer **90**, there is no necessity for providing the section with any transfer portion similar to transfer portions **104** for the upper decks.

The jump conveyer portions for the various speed-up conveyer sections are similar, and only one will be described in detail. Specifically, and considering the topmost jump conveyer portion **102**, each comprises a series of jump belts **110** interspersed with rolls **50** and paralleling the rolls. The belts are trained at their left set of ends in FIGS. 1 and 2 over pulleys **112** secured to a shaft **114** journaled in bearings **116**. The belts are trained at their right set of ends in these figures over pulleys **118** secured to a shaft **120** journaled in bearings **122**.

Extending under the upper run of each belt **110** is an elongated rail **130**. Adjacent the ends of each rail **130** are guide rollers **132**. These are rotatably mounted on the rail, and engage the inner surface of the belt while guiding it smoothly over the ends of the rail. The rails **130** under the belts are shiftable up and down to shift the upper, work-supporting runs of the belts between operative and inoperative positions, respectively. In their operative position, the upper runs of the belts are above the support level defined by the rolls **50** of a conveyer section (in the position indiacted by dashed line **110***a* in FIG. 1), and any material supported by the rolls prior to shifting of the belts upwardly is lifted by the belts. In their inoperative position, the upper runs of the belts are below the support level defined by the rolls (the position shown in solid outline in FIG. 1) and the rolls provide support for veneer pieces.

Considering now the mechanism for shifting the belt runs up and down, and with reference to FIG. 1, extending between complementing beams **44** at either end of the apparatus, and beneath each rail **130**, is a beam **140**. Each rail **130** is connected to a beam **140** directly beneath it through pivoted links **142**. The links connect a rail to a beam while enabling the rail to swing upwardly to a raised position. The rails of each jump

conveyer portion are raised and lowered in unison, by means of a transversely extending crankshaft **144** (see FIG. 2) journaled at its ends in a pair of beams **140**, and having crank arms **146** connecting the shaft to the rail members. A jack or ram **148**, with its cylinder end pivotally connected to a frame member **150** of the frame and the rod end thereof secured to shaft **144** through arms **151** is extended to rotate the crankshaft in a direction producing raising of rails **130**. Contraction of the ram returns the rails to their lowered position. The ram constitutes power-actuated means for moving the upper belt runs of a given jump conveyer portion between operative and inoperative positions. The ram thus produces ejectment of sheets from the apparatus after end alignment of the sheets.

The belts of each jump conveyer portion in the embodiment shown are constantly moving, with their upper runs traveling from left to right in FIGS. 1 and 2. Thus veneer supported on the upper runs is shifted laterally to the right and toward the off-bearing conveyer. Chains **152**, trained over sprockets secured to the ends of pulley shafts **120** interconnect the belts of the various jump conveyer portions so that the belts are all driven in unison. The motor (not shown) driving belts **92** of the off-bearing conveyer provides power for moving the belts of the jump conveyer portions, as it will be noted that bottom pulley shaft **120** is rotated by belts **62** through the pulleys **98**.

Completing the description of the jump conveyer portions, belt tighteners are indicated at **160** and these are pivoted to the beams **140**. The belt tighteners are equipped with rollers **162** that engage the inner surfaces of belts **110** and produce tensioning of the belts with the upper runs of the belts either in their operative or inoperative position. Also guiding the belts are guide rollers **164**.

The transport conveyer portions **104** that receive sheets removed by the jump conveyer portions of speed-up conveyer sections have feed ends **104***a* adjacent the discharge ends of the jump conveyer portions, and their discharge ends **104***b* are located closely adjacent the off-bearing conveyer **90**. Pieces of veneer travel down the transport conveyer portions, whence they are dropped onto the off-bearing conveyer without substantial change in the relative positions of the pieces. A supporting frame for the various transport conveyer portions is indicated at **170**. This is secured to frame **32** of the unloading mechanism. Each transport conveyer portion comprises laterally spaced belts, such as belts **172**, trained at one set of ends over pulleys **174** and at their other set of ends over a roll **176**. Pulleys **174** are secured to an appropriate pulley shaft **120**. The belts move constantly and at the same speed as the belts of the jump conveyer portions, through the connection of pulleys **174** with the pulley shaft. Belt tighteners are indicated at **180** that tension the belts.

Movement of the jump belts up and down, and thus travel of veneer onto the off-bearing conveyer, is controlled automatically by movement of veneer from the discharge ends of the decks of the dryer. Thus the apparatus, in a manner of speaking, is "veneer controlled." Runs of different lengths of veneer may be handled without adjustment needed in the controls for the apparatus. This is a definite advantage.

Considering any given deck in the dryer, when the veneer pieces in a charge or group of pieces traveling along a deck travel out of the discharge end of the deck and onto the speed-up conveyer section in front of the deck, belts **110** of the clearing conveyer mechanism for the section are adjusted to their lowered, inoperative position, so that the veneer pieces are entirely supported on steel rolls **50** of the conveyer section. With the veneer pieces completely out of the dryer, and after a time interval sufficient to assure that the lead ends of the veneer pieces have aligned themselves against a plate **88**, jump

belts **110** are raised to their operative position to start removal of veneer from the conveyer section. After the veneer pieces are removed, the belts return to their lowered position. FIG. 4 illustrates schematically a control system whereby such regulation of the jump belts is produced.

With reference first to FIG. 3, supported above the path of veneer as it leaves each dryer deck, adjacent the feed end of the speed-up conveyer section for the deck and somewhat in front of the discharge end of the dryer deck, is an elongated gate or detector **186**. This extends substantially continuously across the path of the veneer, at what is referred to herein as a control station in the apparatus. The gate is pivotally mounted on frame **32**, so that it can swing between lowered and raised positions. The gate in its lowered position (indicated for the top gate in FIG. 3 in solid outline) has a bottom edge **188** projecting into the path of travel for veneer. Veneer on striking the gate swings it to its raised position (shown for the top gate in FIG. 3 by the dashed outline **186***a*), and the gate remains in its raised position until all the pieces of a group or charge of veneer pieces has traveled beyond the gate, allowing it to return to its lowered position. This movement of the gate controls the control system shown in FIG. 4.

Referring to FIG. 4, L1 and L2 indicate source conductors, and the gates for the various speed-up conveyer sections are indicated at **186**. Each gate is ganged to a switch **187**. A valve for regulating ram or jack **148** actuating the jump belts of each jump conveyer portion is indicated at **189**. A solenoid **190** is ganged to each valve **189**, and upon energizing of solenoid **190** the valve **189** ganged thereto is adjusted to cause extension of the ram **148** controlled by the valve and movement of the belts in a jump conveyer portion to their raised or operative position. On deenergizing of the solenoid, valve **189** is adjusted to cause contraction of ram **148** and lowering of the belts to their inoperative position. A time delay mechanism for each speed-up conveyer section is indicated at **192**. Each is constructed to close a switch **194** ganged thereto after a closed circuit is completed to the terminals of the time delay mechanism, but to do so only after a short time interval has elapsed. Switch **194** is used in making and breaking a circuit between solenoid **190** and source conductors L1, L2.

When a gate **186** in front of a dryer deck swings upwardly or in a counterclockwise direction in FIGS. 3 and 4 (as when veneer pieces pass thereunder), the switch **187** ganged thereto is opened, which breaks the circuit for a time delay mechanism **192**, causing opening of a switch **194** and the circuit to the solenoid **190** controlled by the time delay mechanism. With opening of the circular, the solenoid is deenergized, and the valve **189** ganged to the solenoid is adjusted to cause contraction of a ram **148** and adjustment of the jump belts in front of the dryer deck to their lowered, inoperative position. When the veneer pieces have traveled completely beyond the gate, it swings down, closing a switch **187**. On closing of switch **187**, a closed circuit is completed to the terminals of time delay mechanism **192**, but switch **194** ganged thereto remains open for a short time interval. This is to allow veneer pieces traveling on the speed-up conveyer section to move fully to the end of the conveyer section against its positioning or stop means **24**. After the time interval has elapsed, switch **194** closes, solenoid **190** is energized, and valve **189** is adjusted to cause extension of ram **148** and adjustment of jump belts to their raised or operative position. The veneer pieces are picked up and shifted laterally from the speed-up conveyer section, and the jump belts remain in their operative position until a succeeding group of pieces travel into gate **186**, at which time they return to their lowered position.

Reference is now made to FIG. 5, which illustrates diagrammatically the flow of veneer sheets on a deck of a dryer, and how these sheets regulate actuation of the unloading apparatus of the invention. The illustration is also helpful in explaining how sheets travel off on off-bearing conveyor **90** in the same order that they are fed to the dryer, when the dryer is fed using a feeder of the type described earlier that staggers the positions of the sheets on the various decks of the dryer.

On nearing the discharge end of a dryer, a group or charge of veneer pieces on a deck of the dryer deck passes between rolls **18** and **19**, and these, it should be remembered, are rotating at a relatively slow speed. The rolls inhibit forward travel of veneer pieces at any speed faster than the speed of the rolls. As soon as a veneer piece clears these rolls, however, forward travel of the veneer pieces is determined by the speed of rolls **58**, **50**, which is substantially faster. In FIG. 5, veneer sheets or pieces indicated in solid outline at A_1, A_2, and A_3 typify sheets of a group not yet between rolls **18** and **19** at the discharge end of a dryer. Sheets or pieces indicated in solid outline at B_1, B_2, and B_3 represent the veneer sheets in a group immediately in front of sheets A_1, A_2, and A_3. It will be assumed for purposes of this discussion that the pieces are all the same length, and that the middle pieces of a group while they travel through a dryer are advanced in the dryer some two inches or so in front of pieces in the group at the sides of the dryer (a typical phenomenon in a dryer).

It will be noted with reference to FIG. 5 that pieces B_1 and B_3 have their trailing ends still between rolls **18**, **19** and are spaced in front of pieces A_1 and A_3 a relatively small distance (the usual spacing between the sheets of successive charges on a deck produced by a feeder). Sheet B_2, however, has moved a substantial distance in front of sheet A_2, since its trailing edge was ahead of the trailing edges of sheets B_1 and B_3 and its trailing edge has already passed beyond rolls **18**, **19** of the dryer, allowing the speed-up conveyer section to move it rapidly forwardly.

As forward travel of sheets B_1, B_2, and B_3 continues, a condition is reached where all of their trailing edges have cleared rolls **18**, **19**, and the relatively fast moving speed-up conveyer section has shifted them so that they have approximately the relative position indicated by the dashed outlines for the sheets in FIG. 5. With this relative position, the middle sheet (as indicated by the middle sheet shown in dashed outline) may be against plate **88**, whereas sheets on either side of the sheet may have barely cleared gate or detector **186**. Gate **186** senses when the trailing edges of all sheets in a charge have passed beyond it, and the time delay mechanism described for each speed-up conveyer section is needed to allow trailing sheets in a charge time enough to reach plate **88** before raising of the jump belts.

Pieces B_1, B_2, and B_3, after coming into contact with stop plate **88**, have forward or lead ends aligned in a direction extending transversely of the direction of travel of sheets onto the speed-up conveyer section. Note that this is substantially the same relative position they occupied when fed to the dryer (a dryer feeder feeds sheets with forward ends of the sheets aligned). The jump belts, after alignment of the sheet ends, clear the speed-up conveyer section by shifting sheets in the direction of the arrow in FIG. 5, to enable the section to receive another charge. With reference again to FIG. 5, the conveyer section must be cleared before the lead ends of sheets A_1, A_2, and A_3 encounter gate **186**.

All decks in a dryer are unloaded in the same manner as the unloading of the deck just described. Since the positions of sheets in charges or groups on different decks are staggered, the unloading of decks is done sequentially, with sheets leaving the dryer and being fed to the off-bearing conveyer in the same order that they were fed to the dryer. The result is a substantially continuous flow of sheets onto the off-bearing conveyer, with the sheets

arranged in an orderly manner and without overlapping or skewing in the sheets.

It should be noted that an important concept involved in the invention is the moving of sheets at an accelerated speed out of a dryer with the sheets moving in the same direction that they travel through the dryer, subsequently stopping the sheets and aligning their forward set of ends, and then, after the sheets are stopped, shifting them in a lateral direction. A further feature is incorporation of this idea with the common off-bearing conveyer, and the utilization of such an unloader with a dryer where the sheets occupy staggered positions on the various decks. Also important is the manner in which the trailing ends of veneer pieces control the timing of the actuation of the jump belts.

While an embodiment of the invention has been described, it should be apparent that various modifications and variations 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 by Letters Patent:

1. In combination with a multideck conveyer having stacked power-driven conveyer decks operable to move sheets forwardly in paths stacked one over another with said sheets traveling at a given speed, apparatus for unloading the sheets from the discharge ends of the decks of the multideck conveyer comprising a power-driven speed-up conveyer section for each deck disposed in receiving relation to the deck and operable to transport the sheets forwardly from the discharge end of the deck at a speed which is faster than the speed at which the sheets travel on the conveyer deck, positioning means for each speed-up conveyer section operable to halt sheets on the speed-up conveyer section and position the lead ends of such sheets, an off-bearing conveyer constructed to transport sheets along a path extending to one side of the various speed-up conveyer sections, and intermittently operated clearing conveyer mechanism for each speed-up conveyer section operable when actuated to shift sheets laterally from the speed-up conveyer section in approximately the relative position they have after positioning by said positioning means and to transport such sheets in this approximate relative position onto said off-bearing conveyer.

2. For a sheet-handling, multideck conveyer having stacked conveyer decks operable to move sheets forwardly in paths stacked one over another, apparatus for unloading sheets from the discharge ends of the decks of the multideck conveyer comprising a speed-up conveyer section for each deck constructed to transport sheets forwardly from the discharge end of the deck, clearing conveyer mechanism for each speed-up conveyer section adjustable between an inoperative position where sheets on the speed-up conveyer section are not moved by the clearing conveyer mechanism and an operative position where sheets on the speed-up conveyer section are shifted off the speed-up conveyer section, an off-bearing conveyer receiving sheets from the various clearing conveyer mechanisms, and means constructed to detect the trailing ends of sheets moving on each speed-up conveyer section and controlling adjustment of the clearing conveyer mechanism for the speed-up conveyer section.

3. In combination with a multideck conveyer having stacked power-driven conveyer decks operable to move sheets forwardly in paths stacked one over another with said sheets traveling at a given speed; apparatus for unloading sheets from the discharge ends of the decks of the multideck conveyer comprising; a speed-up conveyer section for each deck including plural, spaced-apart and relatively smooth-surfaced rolls defining a substantially horizontal support plane extending to the front of each deck with the rolls extending transversely of the path of the deck, and means for rotating at least one roll of each speed-up conveyer section whereby the roll moves sheets at a faster speed than their speed on the deck feeding the speed-up conveyer section; positioning means for stopping the forward travel of sheets on the rolls of each speed-up conveyer section after the sheets have traveled sufficiently to enable their trailing ends to clear the deck feeding the conveyer section; power-driven jump belts for each speed-up conveyer section substantially paralleling the rolls of the section and interspersed therewith, and means mounting the belts whereby they may be shifted from a lowered position where their upper runs are below the support plane of the rolls, and a raised position where their upper runs are above said support plane; said belts in their raised position moving sheets substantially as they arrange themselves on the rolls of a speed-up conveyer section after positioning by said positioning means and in a path extending laterally of the path the sheets travel on the rolls; a transport conveyer portion for each speed-up conveyer section in front of the discharge ends of the jump belts for the section constructed to move sheets in a path extending forwardly of said discharge ends and comprising laterally spaced belts with upper sheet-supporting runs; and an off-bearing conveyer for transporting sheets in a path extending in the direction of the various transport conveyer portions; said transport conveyer portions converging on and having discharge ends adjacent said off-bearing conveyer whereby they are operable to deposit sheets on the off-bearing conveyer with the sheets substantially in the relative position they have on the transport conveyer portions.

4. For a sheet-handling, multideck conveyer having stacked conveyer decks operable to move sheets forwardly in substantially paralleling paths, apparatus for unloading sheets from the decks of the multideck conveyer comprising a speed-up conveyer section for each deck constructed to transport sheets in a path extending forwardly of the deck, positioning means for each speed-up conveyer section operable to halt sheets transported by the speed-up conveyer section and position the lead ends of such sheets, clearing conveyer mechanism for each speed-up conveyer section adjustable between operative and inoperative positions and constructed only when adjusted to operative position to shift sheets laterally from its speed-up conveyer section in approximately the relative position the sheets have on the section after positioning by said positioning means and to transport such sheets laterally of the conveyer section, a control station for each speed-up conveyer section adjacent the feed end of the section, a sheet detector for each speed-up conveyer section sensitive to the presence or absence of any sheets in the control station, and control means connecting the sheet detector of each coveyer section and the clearing conveyer mechanism for the section constructed to adjust the clearing conveyer mechanism to its inoperative position with sheets disposed in said control station.

5. The apparatus of claim 4 wherein the control means includes time delay means whereby, with sheets first disposed in the control station of a conveyer section, and on subsequent removal of sheets from the control station, the clearing conveyer for the section is maintained in an inoperative position for a time interval following the removal of the sheets from the station.

6. For a sheet-handling, multideck conveyer having stacked conveyer decks operable to move sheets forwardly in substantially paralleling paths, apparatus for unloading sheets from the decks of the multideck conveyer comprising a speed-up conveyer section for each deck constructed to transport sheets in a path extending forwardly of the deck, positioning means operable to halt sheets on each speed-up conveyer section and position the lead ends of such sheets, clearing conveyer mechanism for each speed-up conveyer section adjustable between operative and inoperative positions and constructed only when adjusted to operative position to shift sheets laterally from its speed-up conveyer section in approximately the relative

position the sheets have on the section after positioning by said positioning means and to transport such sheets laterally of the conveyer section, a control station for each speed-up conveyer section adjacent the feed end of the section, a sheet detector for each speed-up conveyer section sensitive to the presence or absence of any sheets in the control station, and control means connecting the sheet detector of each conveyer section and the clearing conveyer mechanism for the section, said control means having means constructed to adjust the clearing conveyer mechanism to its inoperative position with sheets disposed in said control station, time delay means whereby with sheets disposed in the control station the clearing conveyer mechanism is maintained in its inoperative position for a time interval after such sheets leave the station, and means for adjusting the clearing conveyer mechanism to its operative position with sheets removed from the control station and after operation of the time delay means.

7. For a sheet-handling, multideck conveyer having stacked conveyer decks operable to move sheets forwardly in substantially paralleling paths, apparatus for unloading sheets from the decks of the multideck conveyer comprising a speed-up conveyer section for each deck constructed to transport sheets in a path extending forwardly of the deck, positioning means for halting the sheets on each conveyer section and positioning the lead ends of such sheets, an off-bearing conveyer constructed to transport sheets along a path extending laterally of the speed-up conveyer sections and the paths of the decks, clearing conveyer mechanism for each speed-up conveyer section adjustable between operative and inoperative positions and operable in an operative position to shift sheets laterally from its speed-up conveyer section and to transport such sheets onto said off-bearing conveyer, and control means for the various clearing conveyer mechanisms including a detector for each conveyer section sensing the position of the trailing ends of sheets moving onto each conveyer section, said control means adjusting the clearing conveyer mechanism of a conveyer section to an inoperative position with sheets moving into the conveyer section and after a time interval starting when the detector for the conveyer section senses the trailing ends of sheets adjusting clearing conveyer mechanism to an inoperative position.

8. Apparatus for unloading sheets from a conveyer deck comprising a speed-up conveyer section defining a path of travel that is a forward extension of the conveyer deck, positioning means operable to halt sheets on the speed-up conveyer section and position the lead ends of the sheets, an off-bearing conveyer constructed to transport sheets along a path extending laterally of the path of the speed-up conveyer section, clearing conveyer mechanism for the speed-up conveyer section having operative and inoperative positions, said clearing conveyer mechanism in an operative position only shifting sheets laterally from the path of the speed-up conveyer section and in approximately the relative position they have after positioning by the positioning means and transporting such sheets in said relative position onto said off-bearing conveyer, a control station for the speed-up conveyer section adjacent the feed end thereof, a sheet detector for sensing the presence or absence of sheets in the control station, and control means connecting the sheet detector and the clearing conveyer mechanism constructed to adjust the clearing conveyer mechanism to its inoperative position with sheets in the control station.

9. Apparatus for unloading sheets from a conveyer deck comprising a speed-up conveyer section defining a path of travel that is a forward extension of the conveyer deck, positioning means operable to halt sheets on the speed-up conveyer section and position the lead ends of the sheets, an off-bearing conveyer constructed to transport sheets along a path extending laterally of the path of the speed-up conveyer section, clearing conveyer mechanism for the speed-up conveyer section having operative and inoperative positions, said clearing conveyer mechanism in an operative position only shifting sheets laterally from the path of the speed-up conveyer section and in approximately the relative position they have after positioning by the positioning means and transporting such sheets in said relative position onto said off-bearing conveyer, a control station for the speed-up conveyer section adjacent the feed end thereof, a sheet detector for sensing the presence or absence of sheets in the control station, and control means connecting the sheet detector and the clearing conveyer mechanism, said control means having means constructed to adjust the clearing conveyer mechanism to its inoperative position with sheets in the control station, time delay means whereby the clearing conveyer is maintained in its inoperative position for a time interval immediately after sheets leave the control station, and means for adjusting the clearing conveyer mechanism to its operative position with sheets removed from the control station and after operation of the time delay means.

10. In combination with a sheet-handling conveyer deck, a speed-up conveyer section defining a path of travel that is a forward extension of the deck and operable to move sheets traveling thereon at a speed faster than the speed they are moved on said conveyer deck, positioning means constructed to stop sheets on said speed-up conveyer section and position the lead ends of such sheets, an off-bearing conveyer constructed to transport sheets away from said speed-up conveyer section, clearing conveyer means for said speed-up conveyer section having operative and inoperative positions and in said operative position being operable to shift sheets from said speed-up conveyer section in approximately the relative position they have after positioning by said positioning means and transport such sheets in such position toward said off-bearing conveyer, a control station for said speed-up conveyer section adjacent the feed end of the section, a detector for sensing the presence or absence of sheets in said control station, and means connecting said detector and said clearing conveyer means constructed to adjust said clearing conveyer means to its said inoperative position with sheets in said control station.

11. A method of handling sheets traveling on a conveyer where the sheets on the conveyer are arranged in successive groupings with each grouping containing a row of plural sheets extending transversely of the conveyor, the method comprising transporting each grouping of sheets as it arrives adjacent the off-bearing end of the conveyer forwardly from the conveyer and at a speed faster than the speed of its travel on the conveyer thus to produce a spacing between the grouping transported and the next following grouping, stopping the travel of the sheets in the forwardly transported grouping in an aligning station, aligning the ends of the sheets of the grouping in the aligning station, and after a time interval has lapsed from the time the rearmost sheet in the grouping travels from the off-bearing end of the conveyer conveying the sheets of the grouping out of the aligning station thus to clear the station, said time interval being sufficient to enable end alignment of the sheets in the grouping before they are conveyed out of the aligning station.

12. Apparatus for unloading sheets from a conveyer comprising a power-driven speed-up conveyer section constructed to transport sheets out from the discharge end of the conveyer, with said sheets traveling at a speed which is faster than their travel speed on the conveyer, detector means operable to detect the ends of sheets moving from the conveyer and over said speedup conveyer section, positioning means forwardly of said detector means operable to stop and align sheets with such alignment being in a direction extending transversely of the speed-up conveyer section, and means controlled by said detector means operable to produce ejectment of sheets from the apparatus after their end alignment, said ejectment as controlled by said detector means being at a time

related to the time the ends of the sheets pass said detector means.

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