

Nov. 2, 1965

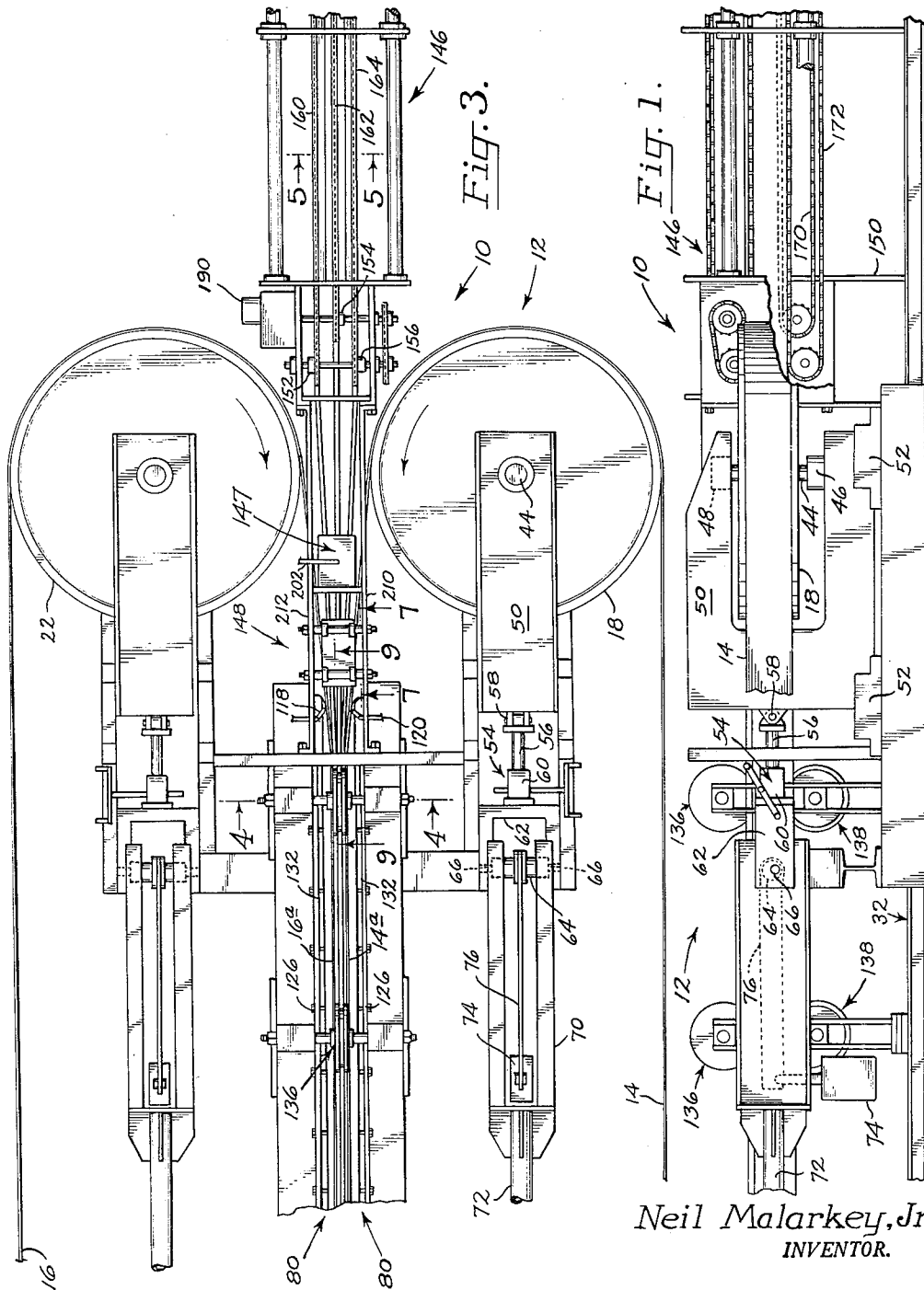
N. MALARKEY, JR

3,215,065

CONTINUOUSLY OPERATING PRESS APPARATUS

Filed Nov. 23, 1962

4 Sheets-Sheet 1



Neil Malarkey, Jr.
INVENTOR.

BY
Ramsay, Rolisch + Hartwell
Attys.

Nov. 2, 1965

N. MALARKEY, JR

3,215,065

CONTINUOUSLY OPERATING PRESS APPARATUS

Filed Nov. 23, 1962

4 Sheets-Sheet 2

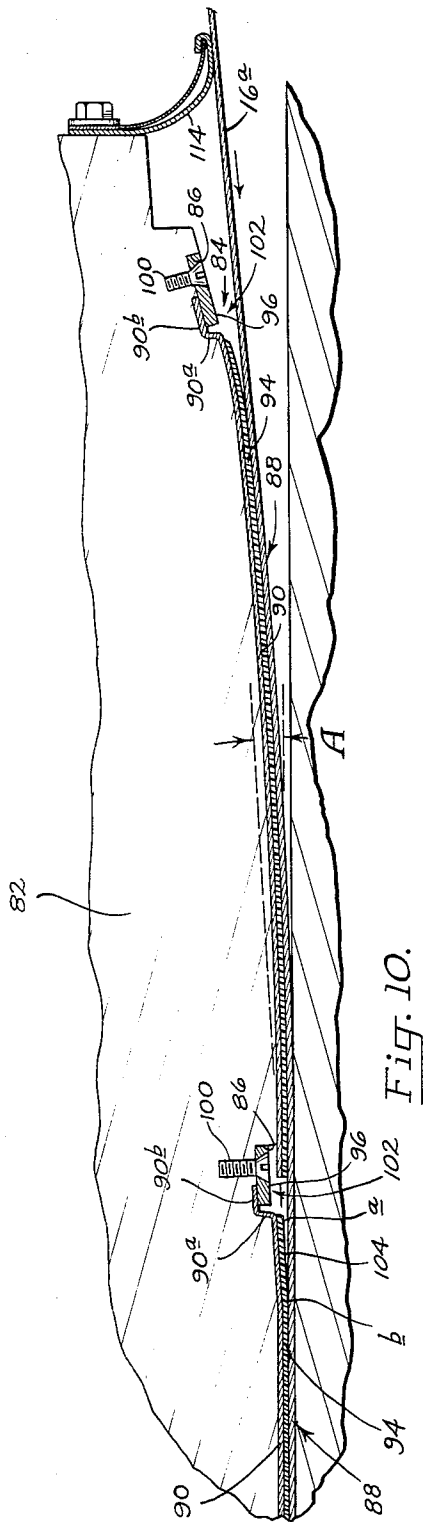


Fig. 10.

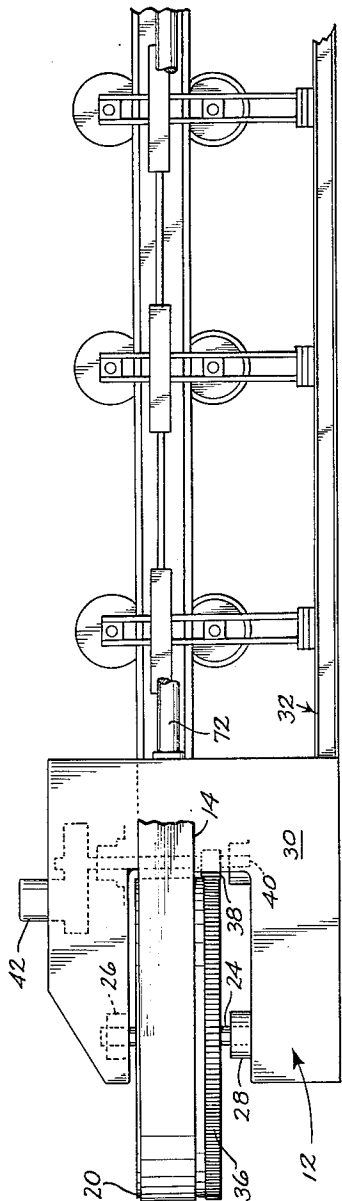


Fig. 2.

Neil Malarkey, Jr.
INVENTOR.

BY
Ramsay, Kolisch + Hartwell
Attys.

Nov. 2, 1965

N. MALARKEY, JR

3,215,065

CONTINUOUSLY OPERATING PRESS APPARATUS

Filed Nov. 23, 1962

4 Sheets-Sheet 3

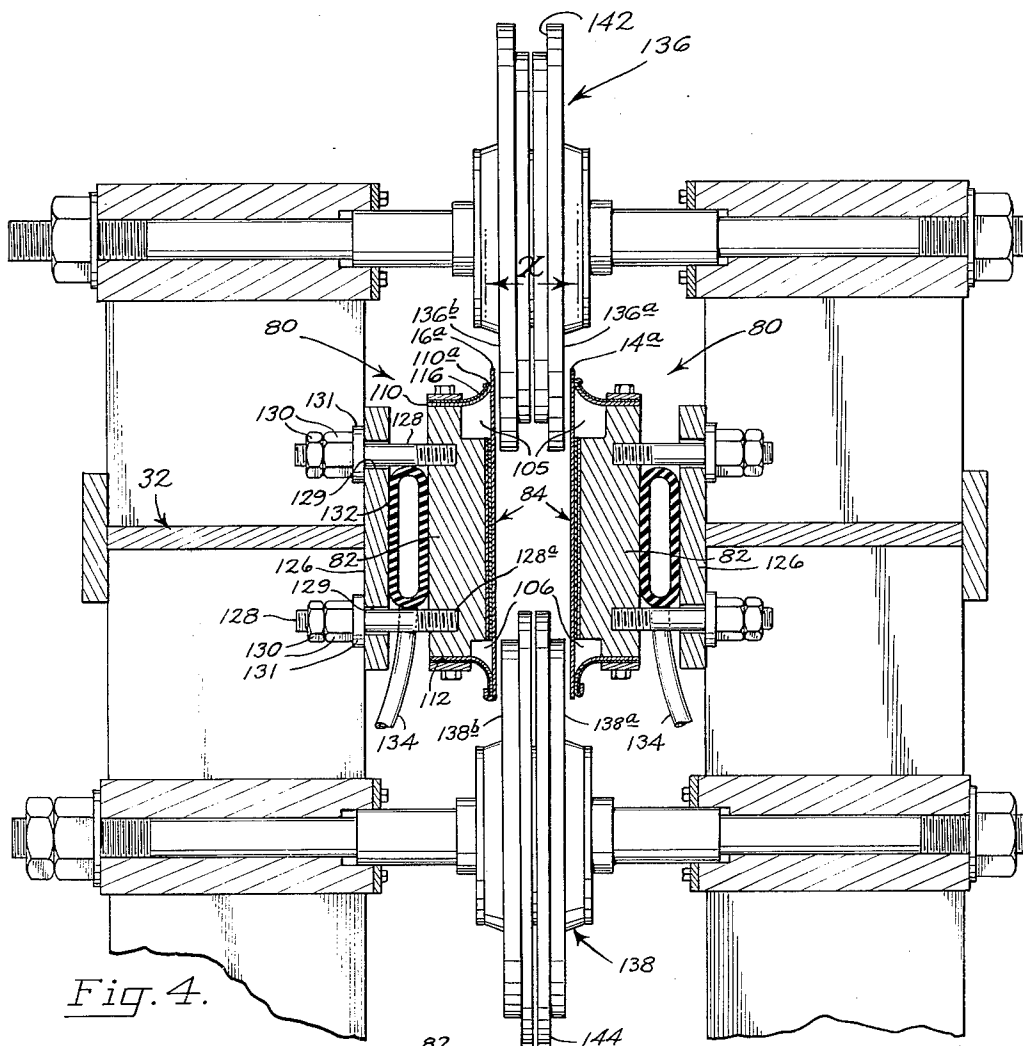


Fig. 4.

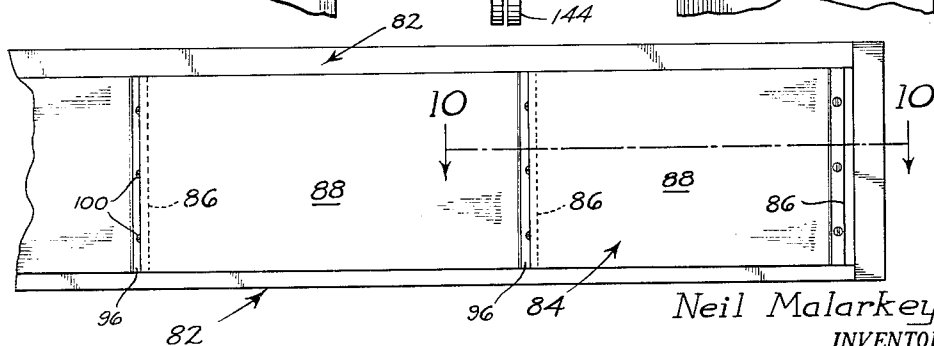


Fig. 9.

Neil Malarkey, Jr.
INVENTOR.

BY
Ramsey, Kolisch & Hartwell
Attys.

Nov. 2, 1965

N. MALARKEY, JR

3,215,065

CONTINUOUSLY OPERATING PRESS APPARATUS

Filed Nov. 23, 1962

4 Sheets-Sheet 4

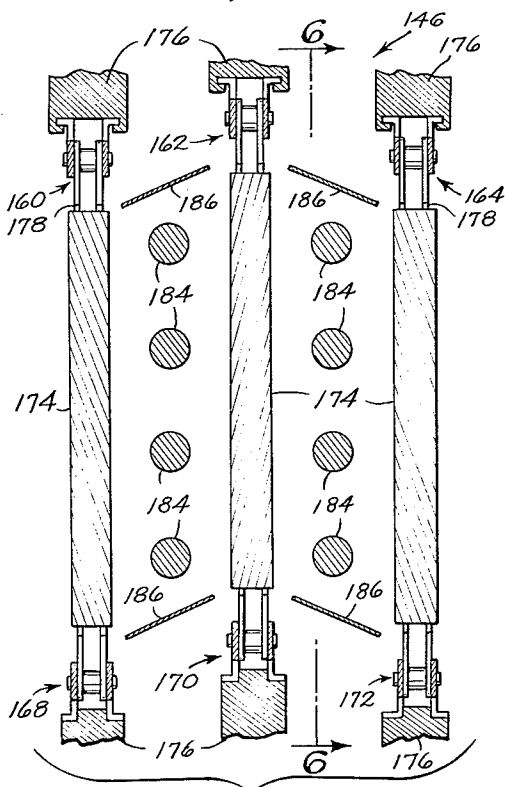


Fig. 5.

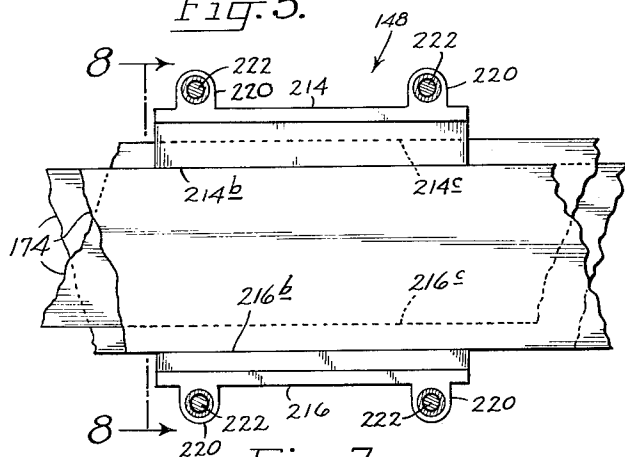


Fig. 7.

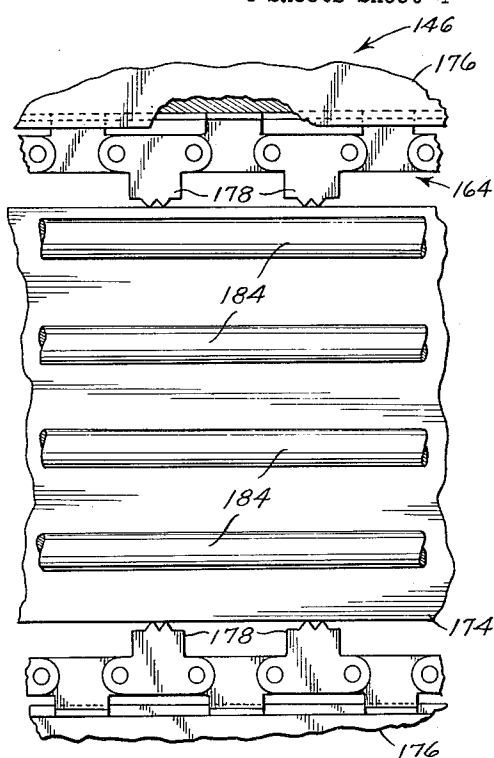


Fig. 6.

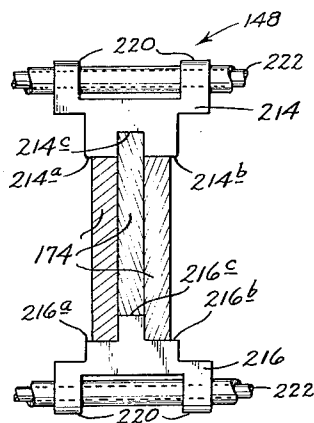


Fig. 8.

Neil Malarkey, Jr.
INVENTOR.

BY
Ramsey, Kolisch & Hartwell
Attys.

1

3,215,065
CONTINUOUSLY OPERATING PRESS APPARATUS
 Neil Malarkey, Jr., Bainbridge Island, Wash., assignor to
 Weyerhaeuser Company, Tacoma, Wash., a corporation
 of Washington
 Filed Nov. 23, 1962, Ser. No. 239,466
 15 Claims. (Cl. 100-93)

This invention relates generally to presses, and more particularly to continuously operating presses, that accommodate the continuous feed of a web of material thereto, with such material then being compressed as it travels through the press. Such presses are useful, for instance, in manufacturing composite products from sheets, or mats of disintegrated material, or a combination of both such materials. It is not intended to be limited to any specific use of the press, however, as certain features of the invention may be applicable to other types of manufacture.

Continuous presses have a number of advantages over batch-type or noncontinuous presses. In addition to enabling flow-type processing, greater flexibility in the articles that may be handled is possible with a continuous press. Thus, a continuous press may be used with equal facility in pressing long or short articles, whereas with a batch-type press, the length of the article that may be handled conveniently is determined to some extent by the length of the press.

An object of this invention is to provide an improved, continuous-type press, which is relatively easy to operate, requires little maintenance, and generally constitutes a practical solution to the many problems that are involved in pressing materials continuously.

In a continuous press employing some form of continuous conveyer belts with opposed belt runs for moving material therethrough, and platens urging the belt runs together, difficulties are encountered with respect to applying proper pressure to the articles being processed, at the time such articles first enter the press, and finally leave the press, as well as when the articles are traveling through middle portions of the press. For instance, and considering the pressing of a four-inch-wide laminated board, when such an article first enters the press and the press is empty, the platens that apply pressure tend to skew while accommodating the board lodged between the platens adjacent one side of the press only. The article spreads apart and supports the platens adjacent one side of the press, but on the opposite side of the press the platens are unsupported. As a result, stressing and wear in the parts occur. Further, because of the skewing tendencies in the platens, an even pressure is not applied to the article. That portion of the article that first enters the press has a relatively high pressure applied thereto, but because of the tilt of the platens, following portions of the article are subjected to less than normal pressure. Similar problems arise when the tail end of the article finally leaves an otherwise empty press. The application of uneven pressures to an article has resulted in considerable waste, which is particularly apparent when the articles being pressed have considerable length.

A feature and object of this invention is the provision of a novel continuous press, where structure is provided that establishes a maximum pressure position for the platens discussed and the belt runs traveling thereover. With the parts in their maximum pressure position, a spacing is left between the belt runs that is only slightly less than the width of the article to be handled. The belt runs may shift away from each other, from their maximum pressure position, and such is resisted by selectively operable means that yieldably urge the belt runs and platens toward their maximum pressure position. With the press contemplated, boards may be fed intermittently to the

2

press, with such immediately receiving the pressure desired, and without skewing of the parts because of unsupported areas in the press.

More specifically, an object of the invention is to provide a continuous press, that includes a pair of oppositely disposed conveyer belt runs extending through the press for carrying work, and which further comprises a backing for each of these belt runs, including a stationary mounting and a pressure platen interposed between the mounting and the belt run, with means interconnecting the two accommodating their relative movement, but limiting movement of the pressure platen in such a manner that the platen is prevented from moving beyond a maximum pressure position.

Another object is to provide such a press, where adjustment mechanism is provided permitting adjustment in the play afforded the pressure platen, thereby to enable the handling of different widths of boards.

A further object is to provide such a press, that includes selectively actuatable means, for yieldably urging the pressure platens to their maximum pressure position, such means having an operative state (wherein the platens are forced to their maximum pressure position), and an inoperative position (where there is relaxation of the force urging the platens together).

In making a laminated article from material such as wooden boards, problems are introduced if the boards are warped, or crooked. If the laminated article is made by bonding under pressure the faces of several boards together, curvature resulting from warp in the boards is taken care of during the pressing process, since press pressure is applied against the faces of the boards. Crooked boards having curvature along their edges (as opposed to their faces, as where the boards are warped), are not straightened by the action of the press. Generally, another object of this invention is to provide press apparatus, including a press section, that includes edge guides immediately on the feed side of the press section, operable to straighten out crooked boards when such are fed to the press section, with the boards traveling into the press section and having pressure applied to their faces, before such release of the board edges as would enable the boards to spring back to their original crooked condition.

In a continuous press, it has been found advantageous to employ opposed runs of movable conveyer belts that slide against stationary platens. The construction outlined has been found to promote the even application of pressure against the opposed faces of the article being processed, and production of good bonds between laminations in the article. To facilitate movement of the belts over the platens, this invention contemplates a novel low coefficient of friction-surfacing means for each platen, comprising a series of plastic-coated shoes, set end to end. The shoes are easily removed and replaced, when necessary for repair purposes. A support is selected for the shoes that supports them firmly, while the shoes support a belt run and perform their antifriction function.

Yet another object of the invention is to provide novel means for lubricating the conveyer belts in a continuous press, where such belts slide over stationary (i.e., non-traveling) platens.

An object related to the above is to provide an improved, continuous-type press, with novel means for lubricating sliding belts, that includes means cooperating with the belts holding their runs in proper position, even in the absence of material in the press.

A still further object is to provide press apparatus for producing a laminated product from boards and the like, which includes a novel preheat section, effective to preheat boards passed therethrough, to ready such boards for feeding into the press section of the apparatus.

Yet another object of the invention is to provide press apparatus, including a preheat section, where edge guides for boards are provided between the preheat section and the press section, to straighten out any crooks in such boards, and where the preheat section includes positive traction conveyer means for properly forcing boards edge-wise through the aforementioned edge guides.

A still further object is to provide, in a continuous press having oppositely disposed conveyer belt runs for transporting articles through the press, novel means for guiding such articles along a path disposed between said belt runs.

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

FIG. 1 is a side elevation, with portions broken away, of portions of apparatus as contemplated by the invention, showing the feed end of a continuous press section, and adjacent the feed end of the press section feed means for feeding material into the press section;

FIG. 2 is a side elevation, also with portions broken away, of the off-bearing end of the press section partially shown in FIG. 1;

FIG. 3 is a plan view of the portions of the apparatus illustrated in FIG. 1;

FIG. 4 is a cross-sectional view, drawn on an enlarged scale, taken generally along the line 4—4 in FIG. 3;

FIG. 5 is a cross-sectional view, on an even larger scale, taken generally along the line 5—5 in FIG. 3;

FIG. 6 is a view taken generally along the line 6—6 in FIG. 5;

FIG. 7 is a sectional elevation, taken generally along the line 7—7 in FIG. 3, drawn on an enlarged scale, and showing portions of edge guides provided for straightening out crooked boards immediately prior to their entry into the press section;

FIG. 8 is a cross-sectional view, taken generally along the line 8—8 in FIG. 7;

FIG. 9 is a view illustrating platen mechanism provided in the press section, taken generally along the line 9—9 in FIG. 3, and drawn on an enlarged scale; and

FIG. 10 is a view, on an even larger scale, taken generally along the line 10—10 in FIG. 9.

In the drawings, apparatus has been illustrated such as may be used in the manufacture of laminated beams from layers of boards bonded together through their faces. A common form of such a beam may be prepared from three boards placed face to face, with an adhesive layer bonding adjacent faces of the boards. While such a beam is described specifically, it should be understood that the apparatus may be equally well used in the manufacture of other types of articles.

Describing the apparatus in general terms, and referring first of all particularly to FIGS. 1, 2, and 3, the apparatus shown comprises feed means including a preheater section, indicated generally at 10, which functions to convey boards continuously into a continuous press section disposed in front of the feed means, and indicated generally at 12. As will be described in more detail below, heat is applied in the preheater section of feed means 10 to those faces of the boards that are to be bonded together. In making a finished beam, glue or adhesive is then applied between these faces, and upon the boards traveling through the press a laminated beam is produced, with the heat stored in the boards serving to set or harden the glue.

Considering now the construction of continuous press section 12, the press section comprises a pair of continuous belts; more specifically, continuous metal bands (shown at 14 and 16), which are provided to transport material through the press. Belt 14 is trained over pulleys or wheels 18, 20, located at opposite ends of the press section, with a run 14a of the belt extending between the pulleys along substantially the center of the press section. Similarly, belt 16 is trained over pulley or wheel 22, and

another pulley corresponding to pulley 20 (not shown) with a run 16a of the belt extending along the length of the press section and disposed opposite run 14a. The belts are moved under power, in a direction to cause their runs 14a, 16a, to move from the feed to the off-bearing end of the press section, or from right to left in FIGS. 1, 2, and 3.

Thus, and considering belt 14, wheel 20 training the belt adjacent the off-bearing end of the apparatus is secured to an upright shaft 24. Shaft 24 has ends journaled in bearings 26, 28, mounted in a standard 30. Standard 30 is mounted in a stationary position on frame 32 of the press. Also secured to shaft 24 is a gear 36, having teeth meshing with the teeth of a pinion gear 38. Pinion gear 38 is fastened to a shaft 40, which is rotated under power by means of a drive motor partially shown at 42. Mechanism (not shown) similar to the one just described is also provided for moving belt 16.

Pulleys or wheels 18, 22 training the belts adjacent the feed end of the press section are shiftable longitudinally, for the purpose of varying the tension in the belts. The mounting for the two pulleys is similar, and thus only one is described. Thus, and considering pulley 18, the pulley is secured to an upright shaft 44, which is journaled in bearings 46, 48. Bearings 46, 48 are mounted in a longitudinally shiftable standard 50. The base of the standard is movably supported in guides 52 mounted on frame 32.

Standard 50 is operatively connected to stationary standard 30 adjacent the other end of the press section, by means that is adjustable to change the spacing between the two. Thus, standard 50 is connected to an extensible jack 54 (including a rod end 56 pivotally connected at 58 to the standard, and a base 60) which is connected to a clevis 62. A cylindrical eccentric element 64, with axially offset shaft ends 66 journaled in the arms of clevis 62, connects clevis 62 with a yoke member 70, (the ends of element 64 being journaled within the arms of member 70). The base of yoke member 70, in turn, is connected through a rigid rod 72 extending longitudinally of the apparatus with a side of stationary standard 30.

Jack 54 may be extended to shift movable standard 50 away from stationary standard 30. Retraction of the jack moves the two standards together.

The eccentric element mentioned is part of structure provided in the apparatus for the purpose of maintaining the tension in the belt uniform. Further describing this structure, a counterweight is indicated at 74, which is connected through a lever arm 76 to eccentric element 64. Counterweight 74 urges the eccentric element in a counterclockwise direction in FIG. 1, with such tending (because of the offset position of shaft ends 66) to urge standard 50 away from stationary standard 30.

Platen structure is provided in the press section for the purpose of urging belt runs 14a, 16a toward each other and against opposite sides of material being processed. This platen structure is best illustrated in FIGS. 4, 9, and 10, and reference is now made to these figures.

Describing now the platen structure, behind each of the belt runs is an elongated platen or pressure member 80, that extends longitudinally substantially parallel to the belt runs of the press section. Each platen 80 comprises a mounting plate or plate means 82 (ordinarily made of a rigid material such as metal), and covering the front side of the mounting plate means a low coefficient of friction-surfacing means indicated at 84. Mounting plate means 82 in a relatively small press may be one integral piece, whereas in a longer press plate separate plate sections disposed end to end may be employed for the mounting plate means.

As best illustrated in FIGS. 9 and 10, extending transversely of each mounting plate means 82, and over the front thereof, are plural grooves 86. These are provided to facilitate mounting of surfacing means 84 over

the front of the plate means. The grooves also have a lubricating function, as will be described.

Each surfacing means 84 comprises a series of plastic-coated shoes 88, disposed end to end. Each shoe comprises a backing plate 90, provided with a shoulder 90a along one edge thereof, which joins with a flange 90b. A plastic cover is provided over the front face of the backing plate, and such is indicated at 94. Such plastic cover, for example, may comprise a "teflon" (tetrafluoroethylene resin) sheet bonded in a suitable manner to the backing plate behind it.

The various shoes disposed over the front of a platen are secured in place by means of mounting strips 96 that fit against the flanges of the shoes and inside grooves 86. The mounting strips are connected, by fasteners 100 extending through the shoes, to the mounting plate means behind the shoes.

By using a series of such shoes disposed end to end, it is possible to remove one or more of the shoes independently of the remaining shoes. Further, greater exactness is allowed in preparing the plastic antifriction covering of the shoes, than would be possible if one continuous antifriction covering were employed. Very important, a lubricating feature is provided, which facilitates movement of a belt over the shoes during operation of the press section.

Specifically, and referring to FIG. 9, it will be noted that, with the shoes in place, an inwardly recessed channel 102 is present in each platen at the location of each groove 86. These channels extend transversely of the platen (and the belt run in front of the platen). The channels of each platen have upper ends that communicate with a passage 105 extending along the length of the platen (see FIG. 4), and lower ends communicating with a similar passage 106.

The channels described, along the side edges thereof nearest the off-bearing end of the press section, are defined by sloping surface portions 104 (see FIG. 10) that are underbeveled with respect to the plane of the belt passing over the front of the platen. In FIG. 10, such a sloping surface portion for one of the channels is illustrated as extending from the point marked *a* to the point marked *b*, and the angle of the underbevel is indicated at *A*.

Sealing means is provided each platen, that bounds the low coefficient of friction surfacing means 84 of the platen. Specifically, for each platen, the sealing means comprises elongated flexible and resilient strips, such as rubber strips 110, 112 (see FIG. 4) extending longitudinally along and secured to the top and bottom of the platen, and similar strips, such as strip 114 (see FIG. 10), at the ends of the platen and extending vertically between and joining with strips 110, 112. The sealing strips have lips or sealing edges, such as edge 110a for strip 110, that engage the back side of the belt in front of the platen, to provide a fluid-tight seal therewith. Each strip may have its sealing edge pressed against the belt in front thereof by means of a spring such as spring strip 116, which is effective to urge the sealing lip or edge of the strip more tightly against the belt. The sealing strips of a platen define a chamber on the back side of the belt run extending over the platen, which chamber is utilized to hold a supply of lubricant.

Lubricant is fed into the just-described chambers of the two opposed platens 80 via lubricating lines 118, 120 (see FIG. 3). These lines communicate with the chambers adjacent the feed end of the press section, and thus fresh lubricant supplied by the lines is drawn by the belt runs over the surfacing means of the platens as they travel toward the off-bearing end of the press section.

Earlier, recessed channels were discussed that extended transversely of each platen, and that had ends connecting with passages 105, 106. The passages and channels are within the chamber bounded by a sealing means. Sloping surface portions were also described for the channels, that were underbeveled with respect to the plane of the

belt passing thereover. These channels are important, in providing proper lubrication, in that they serve to distribute lubricant carried in passages 105, 106 to inner portions of the back of a belt run. Lubricant contained within a channel is drawn by a belt run moving thereover against the sloping surface portion that is provided along the side edge of the channel. This lubricant (because of the convergence of this surface portion with the back of the belt run) ultimately is forced to distribute itself as a thin film over the back of the belt run.

Behind pressure platens 80 in the press section (see FIGS. 3 and 4) are stationary supports or press frame section, exemplified by support plates 126. Each support plate extends along the back of a platen, for substantially the length of the platen. The support plates may be secured as by welding to frame 32 of the press section.

The platens are mounted on the support plates by means of adjustable fasteners 128. The fasteners are slidably received within bores 129 provided in the support plates, and have threaded ends 128a screwed into the platens. Nuts 130 screwed onto ends of the fasteners opposite ends 128a, and washers 131, prevent the fasteners from pulling out of the support plates. The fasteners mount the platens on the support plates, while accommodating a limited amount of play between the platens and the support plates. Adjustment in the position of the nuts changes the amount of play afforded the platens.

Each platen 80 is provided with selectively actuatable means for yieldably urging the platen away from its support plate 126 and toward the belt run in front of the platen, with the extent of such movement limited by fasteners 128. Such means, in the embodiment illustrated, comprises (for each platen) a pneumatic hose 132, which may be filled with air, through a line 134. Upon inflation of the hose, the platen in front of the hose is yieldably forced away from the support plate in back of the hose. Upon deflation of the hose, this force urging the platen away from its support plate is relaxed.

The use of the support plates and fasteners, whereby movement of the platens is limited, is an important feature of the invention. As can be seen with reference to FIG. 4, in the absence of any work in the press, the platens assume a "maximum pressure" position, which is the position illustrated in FIG. 4, and which is the position assumed by the platens when they have been moved toward each other the maximum distance permitted by the fasteners. With the platens in their maximum pressure position, a space or void exists between the platens, and the opposed runs of the belts that slide over the platens. Work is selected for processing in the press which has a thickness only slightly exceeding the spacing between the belt runs with the platens in their maximum pressure position. Such work, for example, may have a thickness approximately equal to the dimension indicated at *x* in FIG. 4. When this work is processed, the belt runs are caused to be spread apart, but only a slight amount. With spreading apart of the belt runs, the work has full pressure applied against opposite faces thereof.

Since a maximum pressure position is established for the platens, and the platens in this position move only slightly to accommodate the work processed, when the end of an article passes into or out of an otherwise empty press, the platens remain substantially parallel, and do not skew because of the lack of any support at one end of the press. This results in more even pressure being applied against the faces of the work. Poor bonds in end sections of articles are minimized. Excessive stressing of the belts and parts is eliminated. Feeding articles to the press is made easier, as the articles are not required to wedge the platens apart from a completely closed position.

Referring again to FIGS. 1, 2, 3, and 4, provided at intervals along the length of the press, adjacent the top and bottom of belt runs 14a, 16a, are top and bottom guide rollers or elements 136, 138. Each is suitably journaled on the frame of the apparatus. In the embodiment of the

invention illustrated, each top guide roller has a grooved perimeter, 142, and each bottom guide roller includes a protruding annular flange portion 144. In the manufacture of a laminated beam from three boards, the rollers position the boards with the center board raised somewhat from the two side boards during their travel through the press section. A finished beam thus is provided with a tongue and groove portion on opposite sides thereof. The rollers define a path of travel for boards, i.e., guide the boards, as they travel through the press section, and prevent the boards from veering out from between the belt runs.

While rollers have been described as guide elements, it should be obvious that other types of guides could be used in some applications, such as sliding shoes, etc.

It should be noted that the perimeters of the guide rollers protrude into the space between belt runs 14a, 16a. With the press section empty, sides 136a, 136b, 138a, 138b of the guide rollers support the belt runs from twisting and falling away from the sealing means described acting on the backs of the belt runs. Thus the guide elements also perform the function of limiting the extent to which the belt runs may move toward each other in the space between platens 80. The minimum spacing of the belt runs permitted by the guide rollers is somewhat less than the spacing allowed between the belt runs by the platens, with the platens occupying their maximum pressure position. Put in another way, the opposed platens in their maximum pressure position permit a certain spacing between the belt runs, and the rollers between the belt runs accommodate this spacing, while preventing the belt runs from moving together appreciably from this spacing.

Considering now feed means 10 for the press section, discussed only briefly above, the feed means comprises (and reference is made to FIGS. 1 and 3) a preheater section 146, where boards traveling toward the press section are heated; a gluing station 147, where glue is applied between those faces of the boards that are to be bonded together; and a guide station 148, where any crooked boards are straightened. Each of these will now be described.

Preheater section 146 is illustrated in FIGS. 1, 3, 5, and 6. The section includes an upper set of three positive-traction conveyer chains 160, 162, 164, with lower runs extending longitudinally of the preheater section and adapted to engage the upper edges of boards such as boards 174, and a lower set of three positive-traction conveyer chains 168, 170, 172, having upper runs disposed opposite the lower runs of chains 160, 162, 164, and adapted to engage the lower edges of such boards. The chains, adjacent the feed and off-bearing ends of the preheater section, are trained about sprockets such as sprockets 152, 154, 156 shown in FIG. 3 for chains 160, 162, 164 at the off-bearing end of the section. Guiding the runs of the chains that engage the edges of boards are guides 176 (see FIGS. 5 and 6).

The various chains have teeth 178 that project outwardly from the chains, with the teeth of chains 160, 162, 164 along the lower runs of these chains projecting toward the teeth of chains 168, 170, 172, along the upper runs of the latter chains. The teeth bite into the edges of boards, thus positively to engage the boards.

Also part of the preheater means are electrically operated heater elements 184, and reflectors 186. With boards gripped by the chains, these are positioned between the boards, and when operated function to heat those faces of the boards exposed to the heater elements.

The conveyor chains of the preheater means are rotated under power by means of motor 190 suitably drivingly connected to the sprockets training the chains. With the motor operated, the various chains are moved so that their oppositely disposed runs move from right to left, or in a direction feeding boards positioned between the chains into the feed end of the press section. As such boards move through the preheater means, they are pro-

gressively heated by the heater elements, and the heat which is stored in the boards is utilized later in setting the adhesive that is deposited over the inner faces of the boards.

It is important that the chains be mounted so that the boards they hold are on edge while traveling through the preheater section. Because of the on-edge positioning of the boards, any knots or sawdust, etc., which may fall from the boards, is allowed to fall by gravity out of the preheater section. This assures continuous operation, and is a factor in reducing accidental damage to the heater elements.

Referring now to FIG. 3, gluing station 147 may take conventional form. The gluing station includes the usual glue applicators, which are operable to deposit a film of adhesive over the inner faces of the two outside boards, and opposite faces of the inner board, while these travel toward the press section. Glue may be supplied to the applicators within the gluing station through glue supply line 202.

As explained earlier, boards made into a laminated beam may be warped and crooked. The usual warped board curves over the face thereof, and curvature because of warp in the board is flattened out by the opposed pressure platens in the press section. Crooked boards are curved along their edges, and such is not eliminated by the platens. Thus, means is provided between the gluing station and press section, that straightens out crooked boards, and holds the boards substantially straight until clamping pressure is exerted on the faces of the boards by the platens in the press section.

More specifically, and referring to FIGS. 3, 7, and 8, mounted on members 210, 212 (which are part of frame 32 of the press section), are an upper edge guide or guide element 214, and a lower edge guide or guide element 216. The guide elements are mounted in place by means of ears 220, which are integral with the guide elements, and bars 222 which are fastened to members 210, 212.

As best seen in FIG. 8, the upper guide element has flat surfaces 214a and 214b, occupying a common plane, that slide against the top edges of the two outside boards passed thereunder, and function to straighten these edges. Recessed into the upper guide element is a channel defined at the top thereof by a guide surface 214c, which slides against the top edge of the middle board, to flatten this edge. Lower guide element 216 is provided with corresponding guide surfaces 216a, 216b, and 216c. The guide elements are of sufficient length to straighten out the usual curvature in a board that results because of a crook therein, and to maintain such board substantially straight prior to the end of such board reaching the press. When the boards travel into the press, their faces are clamped by the belts, which further stabilizes the boards while the remainder are straightened by the guide elements described.

The operation of the apparatus should be clear from the above description. Briefly, to produce a laminated beam from three boards disposed side by side, the boards first are fed continuously through preheater section 146, with the edges of the boards gripped between the positive traction chains discussed. The boards travel with their faces perpendicular and on edge, through the preheater section, and those faces that are to be bonded together are heated by the electrically operated heater elements disposed along the length of the preheater section. On the boards leaving the preheater section, they retain sufficient heat to produce setting of the adhesive which is subsequently applied thereto.

On passing through the gluing station, films of adhesive are applied to those faces of boards that are to be bonded together. The boards then pass through the guide elements 214, 216, where curvature along the edges of the boards, such as is found in crooked boards and the like, is removed. With the boards substantially straight, they

pass into the press section, and are then firmly gripped by the conveyor belts described.

Prior to entry of boards into the press section, the platens are prevented from moving the opposed runs of the belts tightly together. Instead, the platens occupy their maximum pressure position, as determined by fasteners 128. These platens and the belt runs extending across the platens are wedged apart only slightly when boards first travel into the press section, with the belt runs on being wedged apart remaining substantially parallel. Material moves easily into the press section, with a minimum amount of stressing of the parts.

Belts 14, 16 move easily through the press over the plastic-coated antifriction shoes. On traveling over the plastic-coated shoes, lubricant is continuously applied to the back sides of the belts, from the chamber holding lubricant on the back sides of the belts. The underbeveled surface portions discussed promote complete lubrication.

In the absence of any material between the runs of the belts in the press section, the belt runs are maintained in position and lubricant is prevented from leaking past the seals, by the guide rollers mentioned that space the belt runs.

Laminated products are produced using the press that have good adhesive bonds between the layers therein. Either short or long beams may be produced with equal facility.

While there has been described a particular embodiment of the invention, it is appreciated that modifications and variations are possible. It is not intended to be limited to the specific construction disclosed, but to cover all variations of the structure 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 a press,
a movable belt run adapted to transport work through the press,
pressure-applying mechanism positioned behind said belt run and including nontraveling low coefficient of friction-surfacing means over which said belt run slides,
sealing means bounding said low coefficient of friction-surfacing means on the back of said belt run and defining with the back side of the belt run a chamber for holding lubricant,
recessed channels in said surfacing means and within said chamber extending transversely of the belt run, and
passages within said chamber extending longitudinally of said belt run and connecting the ends of said channels.
2. The press of claim 1, wherein said recessed channels along the edges thereof that face the direction in which the belt run moves are provided with sloping surfaces that are underbeveled with respect to the plane of the belt run.
3. In a press,
a movable belt adapted to transport work through the press,
elongated pressure-applying mechanism positioned behind said belt run and including an elongated nontraveling low coefficient of friction-surfacing means over which said belt run slides,
said low coefficient of friction-surfacing means comprising a series of plastic-coated shoes disposed end to end in a row paralleling said belt run,
sealing means bounding said low coefficient of friction-surfacing means and defining on the back side of said belt run a chamber for holding lubricant,
recessed channels in said surfacing means and within said chamber extending transversely of the surfacing means and located at the adjacent ends of adjacent shoes, and

means connecting the ends of said channels within said chamber.

4. Pressure platen mechanism for bearing against a moving run of a conveyor belt comprising

mounting plate means,
a series of plastic-coated shoes disposed end to end in a row and mounted over one side of said mounting plate means,
each of said shoes including a rigid backing plate provided with a shoulder at one end thereof,
said mounting plate means including a series of grooves receiving the shoulders of said shoes, and
means fastening said shoes to said mounting plate means adjacent said shoulders.

5. The pressure platen mechanism of claim 4, which further comprises

sealing means bounding the series of plastic-coated shoes and defining a lubricant chamber, and
passage means connecting the ends of said grooves within the area bounded by said sealing means.

6. In press apparatus,

a preheater section including at least a pair of oppositely disposed positive traction conveyor chains mounted one above the other and operable to transport boards on edge and with the planes of such boards vertical, and heater means positioned on either side of the path of boards held by said conveyor chains for heating opposite faces of the boards,

upper and lower edge guides on the off-bearing side of said positive traction chains operable to engage top and bottom edges, respectively, of boards advanced thereto by said conveyor chains, and

a continuous press section including a pair of movable conveyor belts mounted on the off-bearing side of said edge guides, said belts having oppositely disposed runs disposed in a vertical plane and operable to engage opposite faces of boards while the same have their edges held by said edge guides.

7. The press apparatus of claim 6, wherein the press section includes a pair of pressure platens positioned with one behind one and the other behind the other of said belt runs, and

means mounting the pressure platens accommodating their relative movement away from each other but inhibiting their relative movement toward each other from said position,

said belt runs with said platens in said position being spaced apart to leave a void between the runs for the reception of boards.

8. In press apparatus, the combination of

a press section including a pair of oppositely disposed movable belt runs adapted to clamp onto opposite faces of boards fed the press section, and means for urging said belt runs together,

oppositely disposed and spaced apart edge guides positioned in feeding relation to said belt runs operable to produce straightening of boards through engagement of the edges of the boards while supporting the boards with their faces substantially paralleling said belt runs, and

positive traction conveyor means on the feed side of said edge guides for feeding boards to the edge guides with such boards disposed so that their edges are advanced between and against said edge guides,
said positive traction conveyor means comprising at least a pair of continuous chains mounted with runs of the chains in oppositely disposed relation,
said chains having teeth that project toward each other along said oppositely disposed runs.

9. In a press,

a movable belt run adapted to transport work through the press,

pressure-applying mechanism positioned behind said belt run and including nontraveling low coefficient

11

of friction-surfacing means over which said belt run slides,
 sealing means bounding said low coefficient of friction-surfacing means on the back side of said belt run and defining with the back side of the belt run a chamber for holding lubricant,
 a recessed channel in said surfacing means and within said chamber extending transversely of the belt run, and
 a pair of passages within said chamber extending longitudinally of said belt run, one of said passages connecting with one end of said channel and functioning as a supply passage for fresh lubricant to the channel and the other of said passages being spaced laterally from said one passage and forming a drain for spent lubricant.

10. In press apparatus with feed and offbearing ends, the combination of

a press section including a pair of press section belts having oppositely disposed movable belt runs adapted to clamp onto opposite faces of boards fed the press section, and means for urging said belt runs together, oppositely disposed and spaced apart elongated edge guides positioned in feeding relation to said belt runs operable to produce straightening of boards through engagement of the edges of the boards while supporting the boards with their faces substantially paralleling said belt runs, and

at least a pair of elongated, continuous feed conveyer belts having a pair of reaches which are substantially parallel and in oppositely disposed relation, said feed conveyer belts being mounted with one of their said reaches located toward the feed end of the apparatus from and in substantial longitudinal alignment with one of said edge guides, and the other of their said reaches located toward the feed end of the apparatus and in substantial longitudinal alignment with the other said edge guides, said reaches providing means for feeding boards to the edge guides by frictional engagement of said reaches with edges of the boards, and such boards on leaving the reaches having their edges moving between and against said edge guides which are aligned with the reaches.

11. The press apparatus of claim 10, which further comprises preheater means for heating the faces of boards, said preheater means being positioned adjacent said reaches of said feed conveyer belts and opposite faces of boards held through their edges by said reaches, whereby boards are heated at the same time that such are being conveyed by movement of the reaches of said feed conveyer belts which contact the edges of the boards.

12. In press apparatus, the combination of

a pair of opposed, spaced apart, elongated conveyer guides, substantially parallel to each other, an elongated continuous feed conveyer belt for each guide mounted with a run thereof extending over and supported by the guide, whereby there are a pair of oppositely disposed feed conveyer belt runs extending over said conveyer guides,

said feed conveyer belt runs providing means for frictionally contacting edges of boards transported between the conveyer guides, with such boards lying in a plane defined by said two feed conveyer belt runs and having faces exposed between the feed conveyer belt runs,

heater means for heating the faces of boards while such boards are held and transported forwardly by the feed conveyer runs, and

a press section, including a pair of oppositely disposed movable press belt runs adapted to clamp onto opposite faces of boards, mounted in receiving relation adjacent the offbearing end of said feed conveyer belt runs.

12

13. In a press; a movable belt run having a front side adapted to transport work through the press, and a back side opposite said front side; pressure-applying mechanism positioned adjacent the back side of said belt run and including nontraveling low coefficient of friction surfacing means over which said back side of said belt run slides; sealing means bounding said low coefficient of friction surfacing means, and defining, with the back side of said belt run and said low coefficient of friction surfacing means, a chamber for holding lubricant; a recessed channel in said surfacing means and within said chamber extending transversely of the belt run for introducing lubricant between the back side of said belt run and said low coefficient of friction surfacing means; and means forming a passage communicating with said channel for introducing lubricant to said channel.

14. In apparatus for processing boards having feed and offbearing ends, the combination of conveyer means for transporting boards; said conveyer means including opposed conveyers for engaging opposite edges of the boards and operable to transport boards from the feed to the offbearing end of the apparatus with faces of the boards exposed; each of said conveyers defining a path of travel for the edge of a board through the apparatus; board-straightener means positioned toward the offbearing end of the apparatus from said conveyer means, in position to have boards fed thereto by said conveyer means, including oppositely disposed and spaced apart elongated edge guides, with each of said edge guides defining a path of travel for the edge of a board which is a continuation of the path of travel defined by one of said conveyers of said conveyer means; said board-straightener means operating to produce straightening of boards through engagement with edges of the boards; and a continuous press section receiving boards from said straightener means including a pair of oppositely disposed movable belt runs adapted to clamp onto opposite faces of boards traveling from said board-straightener means.

15. In a press, a pair of oppositely disposed, spaced apart pressure platens; a pair of endless imperforate flat bands mounted with a run of one substantially paralleling a run of the other; said runs extending between the pressure platens with the back face of one run extending over the front of and adjacent and substantially paralleling the face of one platen, and the back face of the other run extending over the front of and adjacent and substantially paralleling the face of the other platen; and sealing means for each platen extending from the platen to the band run in front thereof and defining the opposite edges of a thin lubricant-holding chamber; said opposite edges of said chamber being disposed adjacent opposite edges of the band runs extending between the platens; each of said platens having a series of flat shoes forming its face that are disposed end to end in a row extending along the length of the run of the band in front of the platen, and said shoes being faced with a low coefficient of friction surfacing material; said chamber between its said edges being bounded on one side by said low coefficient of friction surfacing material and on its opposite side by the back face of a run of a band.

References Cited by the Examiner

UNITED STATES PATENTS

1,720,680	7/29	Kleineberg	100—154
2,135,763	11/38	Nicholson	100—154
2,560,902	7/51	Smith.	
2,729,584	1/56	Foster	144—281.2 X
2,981,307	4/61	Malarkey	100—154 X
2,986,083	5/61	Copeland et al.	100—154

WALTER A. SCHEEL, *Primary Examiner.*