ORIENTER FOR WOOD STRANDS


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Int. Cl. B23Q 7/10


References Cited

UNITED STATES PATENTS
2,674,755 4/1954 Schlicksupp.............. 29/211 R
3,714,700 2/1973 Ehrenfellner................. 29/211 R

FOREIGN PATENTS OR APPLICATIONS
976,840 6/1964 Germany.......................... 29/211 R

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ABSTRACT
A device for orienting elongated wood strands comprises an initial strand orienter feeding a cylindrical, finned drum. The drum is rotatable about a central drum axis parallel to a receiving caulk surface. The peripheral surface of the drum includes a plurality of strand orienting fins spaced apart in parallel facing pairs for receiving a continuous measured supply of elongated wood strands or "furnish" from the initial orienter. The strand orienting fins are spaced apart on the drum's peripheral surface by a distance less than the nominal strand length, whereby strands directed onto the peripheral surface between the paired fins are oriented along the fin surfaces with the lengths of the individual strands substantially parallel to one another and to the fins. Means is provided for confining the strands within a space between the fins and drum periphery as the fins are moved in a rotational path from a loading station to a discharge station at which the strands are allowed to fall gravitationally onto the caulk surface. A second drum may be provided intermediate the first drum and the caulk surface. The second drum includes transfer means for receiving strands from the first drum and moving the strands in a rotational path toward the caulk surface from the first discharge station to a second discharge station. At the second discharge station, the strands are released to fall gravitationally across the supporting caulk surface. In either embodiment, the caulk surface is moved horizontally relative to the central drum axis in a direction identical to the direction of movement of the adjacent drum surface. A uniform felted layer of oriented strands is thereby formed along the caulk surface.

17 Claims, 12 Drawing Figures
ORIENTER FOR WOOD STRANDS

BACKGROUND OF THE INVENTION

The invention disclosed herein basically relates to an apparatus for orienting wood strands to produce a felted mat or layer of such strands for ultimate pressing to form a structural reconstituted wood panel or board. Wood "strands" are elongated along the wood grain with the length dimension of each strand being substantially greater than its width dimension across the grain. When making a panel or board, the strands are coated with an appropriate binder, then distributed in a layer on a caul plate as uniformly as possible. This layer is then compacted and cured under high pressure, with or without heat, to bond the strands together.

It has been found that it is desirable to orient the strands in overlapping angular relationships with their lengths substantially parallel to one another and with one edge of the board or panel so as to more closely match the natural dimensional strength properties of wood or veneers. Several layers of strands may be combined to form a final product similar to plywood, where oriented layers are arranged or laid up with the grain in each layer substantially perpendicular to the grain in the adjacent layers.

Various attempts have been made to orient wood strands so they become substantially parallel to one another along their lengths. In most methods, randomly distributed strands are directed between upright spaced vanes of a single orienting device positioned over a moving horizontal caul surface. The plates are arranged parallel to the direction of movement of the caul and may be oscillated or vibrated as disclosed in the U.S. Pat. No. 3,040,801 and No. 3,478,861. These devices are serviceable to somewhat orient wood strands in a prescribed direction. However, for effective operation the caul must move parallel to the plates. Such plates or vane-type orienters have been proposed also for orienting wood strands substantially perpendicular to the path of movement of the caul. This process is usually slow and the orienting effect is somewhat impaired by the perpendicular caul movement.

U.S. Pat. No. 3,115,431 discloses an orienter comprised of a plurality of circular discs mounted to spaced drive shafts. The shafts are positioned so the discs on one shaft overlap and extend between discs on the other shaft. The shafts are powered to rotate in opposite directions and the discs rotate therewith. Strands received between the rotating discs are dropped onto a caul and oriented substantially parallel to the path of movement of the caul.

U.S. Pat. No. 2,854,372 discloses a process for forming a wood particleboard and product wherein random particles are deposited between opposed moving belts. The belts are powered to move in identical directions with operating flights converging gradually in the direction of travel. Strands are received between the working flights of the conveyors. As the strands progress between the working flights, the particles are compressed to form a board wherein the individual strands therein are oriented substantially parallel to a prescribed plane. A secondary process disclosed in this patent uses a vertical box mold wherein strands are projected in a direction parallel to the surface of the intended board to build up the board from one edge thereof with the strands being oriented parallel to that edge.

U.S. Pat. No. 3,714,700 discloses a method and apparatus for orienting slender particles such as wood strands through utilization of a curved chute. The chute is curved about a horizontal axis and includes a lower discharge end. A conveyor at the discharge end of the chute moves in a direction away from the discharge end. Strands are dropped onto the chute and allowed to slide freely down the chute to drop onto the moving support surface. The furnish is dropped onto the chute at random. The orienting theory behind this particular device is that any strands not substantially parallel to the axis of curvature of the chute have to span a part of that curve as a result, quickly shift into the desired position.

German Pat. No. 976,840 shows an orienting device that oscillates about a shaft wherein the furnish is oriented by a wedge formed within the body of the device. The body is oscillated about the shaft to alternately receive a supply of strands from a supply source and move the strands downwardly to deposit them in groups on a caul surface below. Shrouds are provided on opposed sides of the body to prevent the oriented furnish from falling prematurely out of the troughs during turning of the device. The orienting troughs are formed within a body and extend inwardly from a cylindrical outer surface to a point substantially near the axis of the drum.

In the present apparatus, furnish is delivered from a supply source to an initial orienter, and subsequently, onto a peripheral surface between fins of an orienting drum that rotates in a single rotational direction below the initial orienter. The strands are partially oriented through operation of the initial orienter so they may be supplied to the rotating drum in relatively high volumes. The fin spacing on the drum is predetermined to provide a desired degree of orientation. Outer edges of the fins are spaced apart by distances greater than the spacing of inside fin edges joined to the drum periphery. A shroud or vacuum source is provided as means for confining the strands between the fins of the drum as they are moved about a prescribed rotational path from a loading station at a first angular position on the drum adjacent the output of the initial orienter to a discharge station at a second angular position displaced about the central drum axis and adjacent a horizontally moving receiving caul surface. The strands are allowed to fall freely from between the fins at the discharge station. Rotational velocity of the drum may be synchronized with the linear speed of the caul so groups or bundles of strands dropping from between the fins are deposited in a uniform layer on the caul surface. The speed of the caul relative to the rotational speed of the drum may be selectively controlled to produce a crowding effect on the groups of strands as they are deposited onto the caul surface.

The present invention also provides for the use of a secondary drum as a transfer means between the finned drum and caul surface. The secondary drum is utilized to further achieve the crowding effect by rotating at a slower rate than the finned drum and at a speed substantially equal to the linear speed of the caul surface.

SUMMARY OF THE INVENTION

A device is described herein for orienting elongated wood strands, each strand having a nominal length greater than its width. Normally the length will be at least three times the width. The device forms a layer of
directionally oriented strands on a supporting caulk surface preparatory to production of a reconstituted wood product. The device is comprised of a drum interposed between a source of strands and a caulk surface. The drum is mounted for rotation about a central drum axis parallel to the caulk surface and is powered by a drive means for continuous rotational motion. Angular direction about the axis is further object to provide such a device that is operable to orient elongated wood strands so their lengths are substantially parallel to one another at a degree of orientation substantially greater than prior known orienters.

These and further objects and advantages will become apparent upon reading the following disclosure which, taken with the accompanying drawings, disclose preferred and alternate forms of the present invention.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Preferred and alternate forms of the present invention are diagrammatically illustrated in the accompanying drawings wherein:

FIG. 1 is a side elevational view of a preferred form of the present invention;

FIG. 2 is an exploded isometric view of a drum and confining means;

FIG. 3 is a side elevational view of an alternate form of the invention;

FIG. 4 is a sectioned view taken substantially along line 4-4 in FIG. 3;

FIG. 5 is a side elevational view of an additional form of the invention;

FIG. 6 is a diagrammatic representation of one type of felted layer formed by operation of the present invention;

FIG. 7 is another diagrammatic representation of a felted layer of strands formed by the device;

FIG. 8 is a side elevational view of another form of the invention;

FIG. 9 is a side elevational view of another form of the invention;

FIG. 10 is a side elevational view of a yet further alternative form of the present invention;

FIG. 11 is a pictorial view of an alternate form of drum that may be utilized with the present invention; and

FIG. 12 is a sectioned view taken along line 12-12 in FIG. 11.

**DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT**

The device illustrated in several forms in the accompanying drawings is basically utilized to receive elongated wood strands or a “furnish” from a supply source, orient the furnish and place it tangentially onto a horizontally moving caulk support surface to form a “felt” or uniform layer of strands across the caulk width and along the length of the caulk. Such layers are diagrammatically illustrated in FIGS. 6 and 7 of the accompanying drawings wherein the oriented strands are designated generally by the reference numeral 9.

Strands 9 are delivered to the device of the present invention from a supply source 11. Supply source 11 may be a conveyor feeding into a rod cage spreader as shown or any appropriate apparatus for delivering a uniform “rain” of furnish to the device at a prescribed rate over a designated area of coverage.

The “rain” of furnish is received from supply source 11 by a delivery means of the present invention that is generally indicated at 18. Delivery means 18 may be comprised of a form of “vane” type initial or pre-orienter such as a stationary vane pre-orienter 27 or an oscillating pre-orienter 27a. The stationary vane pre-orienter 27 is illustrated in FIGS. 1, 5 and 9; the oscillating vane pre-orienter 27a is shown in FIGS. 3, 8 and 10.

Furnish moves through either pre-orienter with the strands being somewhat oriented thereby before falling
3,896,536

gravitationally onto a rotating drum 16. This "pre-orientation" greatly assists the operating rate of the present apparatus. The "pre-oriented" furnish is worked into a final oriented condition by the drum 16 as it is received at a loading station 24 and subsequently moved to a discharge station 25. Means 22 is provided for confining the furnish against the drum periphery and between adjacent facing fin surfaces extending outwardly from the drum, as the drum 16 is rotated to bring the strands in a prescribed rotational path to a tangential discharge station 25. The strands are dropped in oriented groups at discharge station 25 to fall gravitationally onto the moving cauli surface 12 below.

Both forms of the delivery means 18 illustrated in the accompanying drawings are comprised similarly of a plurality of upright vanes 29. Vanes 29 extend from bottom end edges 31 adjacent to loading station 24, upwardly to upper end edges 33. The upper end edges 33 are parallel and spaced apart from one another by distances determined with respect to the average or nominal length of the strands in the furnish. Generally speaking, the vanes 29 of the stationary pre-orienter 27 are spaced apart so that the distance between vanes adjacent their upper end edges 33 is substantially greater than the nominal length of the strands in the furnish and the bottom end edges 31 are spaced apart by a distance less than the nominal strand length. In the oscillating vane pre-orienter 27a, the vanes may be planar in configuration and spaced apart relative to one another by distances less than the nominal length of strands 9.

Upright vanes 29 of the stationary vane pre-orienter 27 (FIGS. 1,2) serve to initially orient the furnish as it falls gravitationally through and between the converging vanes. Since the spacing between bottom end edges 31 is less than the nominal length of the strands, a pre-orientation of the strands must take place before they are allowed to fall gravitationally through the spaces between bottom end edges 31. Also, upper edges 33 are elevationally staggered across orienter 27 to more quickly pre-orient the strands received from source 11. The upper projecting edges are spaced apart by distances greater than the strand lengths so no strand can bridge any two adjacent edges. The elevationally staggered edges serve to turn some strands toward the desired orientation while allowing a higher through-put of furnish, than would elevationally even edges. Side walls of the higher edges further aid in pre-orientation as the falling strands move downwardly past the lower edges. The oscillating vanes of orienter 27a (FIGS. 3,4) include upwardly projecting sawtooth edges 36 that enhance orientation of the strands as they move opposite to one another. Since the vanes 29 of this form are spaced apart less than the nominal length of strands 9, individual strands may come to rest with one end resting on the sawtoothed edge 36 of one vane 29 and its other end resting on an adjacent vane. The opposed movement of the adjacent vanes however serves to turn the strand in a direction parallel to the length of the vanes, allowing it to fall between the vanes and onto drum 16.

Oscillating vane orienter 27a is illustrated in greater detail by FIG. 4. Vanes 29 of this orienter are pivoted about axes of spaced shafts 34. Each vane 29 is connected at one end to a driving crank arm 38. The remaining end of the vane is connected to an idle crank arm 39. Driving crank arms 38 and idle crank arms 39 are pivotably mounted to shafts 34. Vane 29 are operated to oscillate opposite one another by means of a motor 40 and eccentric drive mechanism 37. Drive mechanism 37 is connected to driving crank arms 38 through means of elongated connecting rods 42. As eccentric drive mechanism 37 is rotated, vanes 29 are simultaneously operated to oscillate back and forth in opposed directions, as indicated by arrows B. Strands received across the sawtooth edges 36 are thereby turned, as described, towards an orientation substantially parallel to the planar surfaces of vanes 29.

The bottom end edges 31 of both forms of initial or pre-orienters described above are provided with angular bent portions 32. These bent portions 32 serve a dual function. First, they lend a longitudinal rigidity to the vanes that is a desirable characteristic, especially with the oscillating type orienter 27a. Such rigidity enables construction of the vanes 29 from relatively thin material. Secondly, the bent portions 32 serve to direct falling strands in the prescribed rotational direction of drum 16. This direction is illustrated in the drawings by directional indicating arrows A.

Drum 16 is illustrated in substantially detail by FIG. 2 of the drawings. As may be noted, the drum includes a peripheral cylindrical surface 19 extending continuously about the central rotational drum axis and axially across the full width of cauli 12. As may be noted in the drawings, the central drum axis is parallel to the supporting cauli surface 12. A drive means 21 is provided to affect continuous rotation of drum 16 in a prescribed angular direction as indicated by arrows A, about the central axis. Drum 16 is located intermediate the cauli surface 12 and delivery means 18 with the central rotational axis being substantially parallel to the vanes 29 and to the horizontal cauli surface 12.

A plurality of fins 56 are arranged in pairs on drum 16. Fins 56 are arranged on the drum so their planar surfaces 56a face one another and the edges thereof are arranged parallel to the upright vanes 29 of delivery means 18. Fins 56 are fixed to the peripheral surface 19 of the drum so they rotate in monolithic with the drum 16 in the direction indicated by arrows A. A corresponding directional path is provided for the cauli surface 12 and is indicated by arrow C in FIGS. 1, 3, 5, 8, 9 and 10.

As described above, fins 56 extend radially outward from the cylindrical peripheral surface 19 of drum 16. They include inside edges 57 mounted to and spaced equally about the drum periphery 19. Fins 56 also include spaced outside edges 58. Edges 57 and 58 are parallel and extend across the axial length of drum 16. Drum 16 is located below delivery means 18 so outside edges 58 of fins 56 are located a prescribed radial distance from the bottom end edges 31 of vanes 29 with respect to the central drum axis. This distance is within a range related to the nominal strand length and may be broadly defined as being less than the nominal strand length.

The radial orientation of fins 56 is such that the spacing between inside edges 57 is slightly less than the spacing between outside edges 58. This characteristic affects orientation of the furnish received from delivery means 18 since drum 16 is designed so the inside fin edges 57 are spaced apart by distances less than the nominal length of strands 9. The slightly converging
surfaces 56a move the strands into orientation as they drop toward drum periphery 19.

It is important to note that the fins 56 do not extend inwardly beyond peripheral surface 19 of drum 16. This consideration serves an important purpose. The relatively large number of spaces between fins enables substantially greater operational speed or rotation of drum 16 while allowing efficient and accurate felting of a strand layer of prescribed thickness on caul surface 12.

To further assist the orientation process, it has been discovered that it is desirable to control the flow rate of furnish into the device so that approximately 20% of the volume included between adjacent fins is filled with strands at loading station 24. With such a volume, strands 9 are allowed to slide over the fin surfaces 56a as they move about the rotational path downwardly from loading station 24 toward discharge station 25. The strands therefore will become aligned with the planar surfaces 56a if they are not already in such a condition.

A number of rotatable brushes 55 may be included to control infed of the pre-oriented furnish to drum 16. Brushes 55 may be rotated opposite to drum 16 in order to prevent undesirable discharge of furnish and to insure proper filling of the space between each pair of fins 56.

The confining means 22 is provided to prevent disengagement of the furnish from between fins 56 as they move from loading station 24 to discharge station 25. Two forms of confining means 22 are illustrated in the accompanying drawings. The first form is comprised of an arcuate shroud 44. Shroud 44 may be fixed relative to rotation of drum 16 and is placed closely adjacent to the outside edges 58 of fins 56. It is sufficiently elongated axially over drum 16 to axially overlap the lengths of fins 56. Shroud 44 further extends angularly about the drum to overlap the fins between loading station 24 and discharge station 25. Strands held between fins 56 are able to slide into abutment with the shroud 44 as they move between the stations 24 and 25. Shroud 44 thereby confines the strands between the fins 56 while allowing them to slide and to be pushed along its interior surface.

Shroud 44 includes an upper edge 45 located angularly above the axis of drum 16 and adjacent to the loading station 24. A lower edge 46 of shroud 44 is displaced angularly below the central drum axis and is adjacent to the discharge station 25. Furnish brought beyond the lower edge 46 is allowed to fall freely tangentially onto the caul surface 12.

A second form of the confining means 22 utilizes a vacuum source 48 to hold the strands against the drum periphery. In this form, (FIGS. 3, 9 and 11) drum 16 is enclosed on both ends. Angularly spaced stationary radial wiper seals 51 are positioned within the drum to seal an area about the drum periphery where it is desirable that the strands be retained in engagement with the drum periphery 19 and between fin surfaces 56a. A plurality of apertures 52 are provided about the periphery 19 so that vacuum pressure may be applied to draw air inwardly through the apertures and into a vacuum area 54 located between the angularly oriented wiper seals 51. Wiper seals 51 are positioned so that suction force is applied to strands as they move from loading station 24 to discharge station 25. The vacuum force is broken at discharge station 25 and the furnish is allowed to fall freely and tangentially from the rotating drum 16 onto the moving caul support surface.

Caul surface 12 is driven to move relative to the central drum axis 25 along a path transverse to the axis. The linear velocity of caul support surface 12 in the form of the device shown in FIGS. 1, 3 and 8 may be synchronized with the velocity of the fins 56 at discharge station 25 relative to the drum axis. This arrangement enables groups or clusters of strands 9 held between each adjacent pair of fins 56 to be individually deposited tangentially onto the caul support surface 12 or onto a previously felted layer of strands. The equal velocities and the tangential relationship between the caul and the drum prevent fins 56 from moving or raking through the previously-deposited felted mat. This is an important feature since the equal velocities allow the caul support surface 12 to be placed closely adjacent to the outside edges 58 of fins 56. With such a close relationship, the furnish falls only a short distance and is therefore maintained in the original orientation produced by the combined efforts of initial strand orienters 27 or 27a and the fins 56. Orientation is further maintained since the furnish is held in individual groups between adjacent fins 56 and thereby falls as loose groups rather than as individual strands. The larger mass of the clusters tends to hold the component strands in alignment as they drop onto the caul.

FIG. 6 is illustrative of a felted mat deposited onto a caul support surface 12 through operation of the form of the present device illustrated in FIGS. 1, 3 and 8. Dashed lines are utilized in FIG. 6 to designate or define individual groups of strands previously held between adjacent fins 56 on drum 16. In such a layer, the area previously occupied by fins 56, or the spacing between individual groups, is substantially less in density and the area approximately in the center of each group. Under some circumstances this may be a desirable characteristic. However, if a more uniform density is desired along the length of the layer, an effect may be produced such as that illustrated in FIG. 7 by utilizing one of two methods. First, the clusters may be crowded together on the caul if the velocity of the fins is controlled to be greater than the linear velocity of the caul, or by utilizing a secondary drum 60 as shown in FIGS. 5, 9 and 10.

The second drum 60 is positioned intermediate the first drum 16 and caul support surface 12. It is mounted to framework 13 for rotation about a second drum axis parallel to the central axis of the first drum 16 and is angularly positioned below drum 16 so that its peripheral cylindrical surface 61 extends between discharge station 25 and a final discharge station 63 adjacent caul support surface 12. The peripheral cylindrical surface 61 of second drum 60 is utilized as a transfer means 64. The transfer means 64 is powered by a second drive means 62 to rotate opposite drum 16. Transfer means 64 receives furnish from the drum 16 and moves it in a rotational path about the axis of drum 60 to the final discharge station 63. Thus it may be understood that the furnish moves along an ogive curve from loading station 24 to final discharge station 63 with the tangent located at discharge station 25.

A second confining means 65 is also provided. It is comprised of a second vacuum source 66 that is similar in configuration and operation to the first vacuum source 48 described above. Second drum 60 is enclosed, with a second set of stationary angular wiper
seals 70 provided therein. Wiper seals 70 define a suction area leading from discharge station 25 to final discharge station 63. The second vacuum source 66 is operable through a plurality of apertures 68 formed through the smooth cylindrical surface of drum 60. Strands are retained on the surface by inward suction force through the apertures 68 as the second drum 63 is rotated about its central axis.

Strands are deposited tangentially onto transfer means 64 at discharge station 25 in individual groups as shown in FIG. 6. Drum 60 rotates in a direction opposite to the direction of rotation of drum 16, to bring the furnish downwardly to the final discharge station 63. Transfer means 64 however does not include a plurality of fins 56 and is thereby able to be positioned closely adjacent to caul support surface 12 and to outer edges 58 of fins 56. Drum 60 further, may be rotated at a speed less than the rotational speed of drum 16. Therefore, the groups of strands in the furnish are crowded together as they are tangentially deposited onto transfer means 64. The opposed curvature of drums 16 and 60 serve to prevent fins 56 from moving through the furnish deposited onto drum 60, thereby avoiding disorientation as well as enhancing the crowding feature. By crowding the individual groups together, a uniform density may be achieved along the length of the oriented felted mat. The caul 12 in this arrangement is moved in the direction of rotational movement of transfer means 64 at final discharge station 63. The linear velocity of caul 12 should be substantially identical to the surface velocity of transfer means 64 at the final discharge station 63 relative to the rotational axis of second drum 60.

Secondary drum 60 may be utilized with substantially any combination of the other illustrated forms of the present device. It is further conceivable that several forms of the present device might be utilized in line along a moving support surface to enable formation of a felted mat containing several layers of oriented wood strands. It is also conceivable that the present apparatus may be designed to move or reciprocate in a horizontal path over a relatively stationary caul.

Fins 56 of drum 16 as described above are utilized to receive, orient, and transfer furnish from a supply source to a caul surface 12 and to deposit the furnish onto the caul surface with the strands oriented along their lengths and transverse to the directional movement of the caul. An alternate form of drum 16 (illustrated in FIG. 11) may be utilized to receive, orient, and place strands so their lengths is substantially parallel to the direction of caul movement. To accomplish this, a plurality of annular fins 71 are provided about the cylindrical peripheral surface of the drum. With such a drum, vanes of the delivery means 18 would necessarily be repositioned so they would be aligned substantially parallel to the annular vanes and perpendicular to the axis of rotation of the drum. Fins 71 may be angularly arranged on the drum as illustrated in FIG. 12 so they converge somewhat downwardly as they lead from exterior annular edges to interior edges fixed to the drum periphery. To prevent strands from sliding gravitationally on the drum toward the discharge station, a vacuum source may be provided substantially identical to that illustrated in FIGS. 3 and 9.

It is believed that the structure and function of the present invention is obvious from the above description and attached drawings. Several alternate forms of the device have been illustrated and described. It is not however intended to restrict the structural details or function thereof to the described and illustrated forms, the scope of the present invention being set out in the following claims.

What is claimed is:
1. A device for orienting elongated wood strands and for forming an oriented layer of said strands across the transverse width of a caul surface preparatory to production of a reconstituted wood product, said strands each presenting a nominal length greater than its width and being oriented in a prescribed direction along the transverse width of said caul, said device comprising:
asource of strands;
said caul surface being located below said source of strands;
a cylindrical drum interposed between the source of strands and the caul surface and having an axial width substantially equal to the transverse caul surface width;
said cylindrical drum being rotatably mounted about a central drum axis parallel to the caul surface, said drum having an outer peripheral surface extending continuously across the width of the caul surface; drive means operatively connected to said drum for imparting to the drum rotational motion in a prescribed angular direction about the central drum axis;
delivery means for receiving strands from the source and for directing a substantially-uniform array of strands onto the rotating drum peripheral surface at a loading station located between said drum and said delivery means at a first angular position with respect to the central drum axis;
strand orienting fins on said drum, said fins including a plurality of adjacent fin surfaces facing one another in pairs, said fin surfaces being located across the drum width and extending outwardly to outer fin edges, said fins being spaced apart at said peripheral surface by distances less than the nominal strand length, whereby strands directed onto the drum peripheral surface between said fins are oriented substantially parallel to one another by contact with the fin surfaces; and
means for confining the strands within a plurality of spaces on the drum, each space being bounded by the drum peripheral surface and a pair of said fin surfaces, as the strands are moved about said rotational path to a discharge station at a second angular position displaced about the central drum axis from said first angular position, and for releasing the strands to fall gravitationally onto the caul surface at said discharge station;
said caul surface and central drum axis being movable relative to one another to enable an elongated layer of oriented strands to be formed on the caul surface.
2. The device set out in claim 1 wherein said delivery means is comprised of an initial strand orienter having a plurality of upright vanes parallel to the outer fin edges on said drum, said vanes extending upwardly from bottom end edges adjacent to said drum and loading station, to upper vane end edges; said upper vane end edges being sufficiently spaced apart to receive strands from said source.
3. The device set out in claim 2 wherein said bottom vane end edges are each angularly inclined in the direction of rotation of said drum.

4. The device set out in claim 3 wherein the upper vane end edges are spaced apart by distances greater than the nominal length of the strands, and the bottom vane end edges are spaced apart by distances less than the nominal length of the strands.

5. The device set out in claim 2 wherein the radial distance from the outer fin edges to the bottom vane end edges, with respect to said central drum axis, is less than the nominal length of said strands.

6. The device set out in claim 1 wherein said means for confining the strands is comprised of an arcuate shroud located closely adjacent said drum and extending (a) continuously axially over the drum to enshroud the strand orienting fins axially along the drum over the width of the caul surface and (b) angularly in the direction of rotation of said drum about said central drum axis between the loading station and discharge station, from a top edge of the shroud located adjacent to and downstream from said loading station, to a bottom edge of the shroud located adjacent to and upstream from said discharge station.

7. The device set out in claim 1 wherein the drum is hollow and enclosed with said peripheral surface having a plurality of apertures therein openly communicating with the drum interior;

and wherein said means for confining the strands is comprised of a vacuum source in communication with a portion of the drum interior for applying a suction force inwardly through the apertures in an angular space between the loading station and the discharge station.

8. The device set out in claim 1 wherein the linear velocity of said orienting fins at said discharge station as they rotate about said central axis is equal to or greater than the relative velocity between the caul and central drum axis.

9. A device for orienting elongated wood strands, each having a nominal length greater than its width and for forming a layer of directionally-oriented strands on a caul surface preparatory to production of a reconstituted wood product, comprising:

a source of strands;

a receiving caul surface having a prescribed transverse width located below said source of strands;

a first drum interposed between the source of strands and the caul surface having an axial width substantially equal to the width of the caul surface;

said first drum being rotatably mounted about a first central drum axis parallel to the caul surface, said first drum having an outer peripheral surface extending continuously across the width of said caul surface;

first drive means operatively connected to said first drum for imparting to the first drum rotational motion in a prescribed angular direction about the first central drum axis;

delivery means for receiving strands from the source and for directing a substantially uniform array of strands onto the rotating first drum peripheral surface at a loading station between said first drum and said delivery means at a first angular position with respect to said first central drum axis;

strand orienting fins on said first drum, said fins including a plurality of adjacent fin surfaces facing one another in pairs, said fin surfaces being located across the drum width and extending outwardly from the peripheral surface to outer fin edges, said fins being spaced apart at said peripheral surface by distances less than the nominal strand length, whereby strands directed onto the peripheral surface between the fins are oriented substantially parallel to one another by contact with the fin surfaces;

first means for confining the strands within a plurality of spaces on the first drum, each space being bounded by the peripheral surface of the drum and a pair of said fins, as the strands are moved about the rotational path from said loading station to a discharge station at a second position displaced about the first central drum axis from said first angular position and for releasing said strands at the discharge station to fall gravitationally from between said fins;

a second drum located between said first drum and caul surface for rotation about a second central drum axis parallel to the first central drum axis, said second drum having a peripheral surface thereon coaxial with said second central drum axis extending across the width of said caul surface;

second drive means operatively connected to said second drum for imparting to said second drum rotational motion about the second central drum axis in a direction of rotation opposite to that of said first drum;

strands transfer means on said second drum for receiving strands at said discharge station from said first drum and for moving said strands therefrom about said second central axis to an angular displaced final discharge station adjacent said caul surface where said strands are released to fall gravitationally onto said caul surface;

second means for confining the strands on said transfer means as they are moved therewith from said discharge station to said final discharge station; and said caul surface and said second central drum axis being movable relative to one another so an elongated layer of oriented strands may be formed on the caul surface.

10. The device set out in claim 9 wherein said delivery means is comprised of an initial strand orienter having a plurality of upright vanes arranged parallel to the outer fin edges on said first drum, said upright vanes extending upwardly from bottom vane end edges adjacent to said loading station, to upper vane end edges spaced apart relative to one another to receive strands from said source.

11. The device set out in claim 10 wherein said bottom vane end edges are angularly inclined in the direction of rotation of said first drum.

12. The device set out in claim 10 wherein the upper vane end edges are spaced apart by distances greater than the average length of the strands and the bottom vane end edges are spaced apart by distances less than the nominal length of the strands.

13. The device set out in claim 9 wherein said means for confining the strands is comprised of an arcuate shroud located closely adjacent said first drum and extending (a) continuously axially thereover to enshroud the strand orienting fins along the drum over the width of the caul surface and (b) angularly in the direction of
rotation of said first drum about said first central drum axis between the loading station and discharge station, from a top edge of the shroud located adjacent to and downstream from said loading station to a bottom edge of the shroud located adjacent to and upstream from said discharge station.

14. The device set out in claim 9 wherein the second drum is hollow and enclosed with said peripheral surface having a plurality of apertures therein open communicating with the drum interior, and wherein said second means for confining the strands is comprised of a vacuum source in communication with a portion of the second drum interior for applying a portion of the second drum interior for applying a suction force inwardly through the apertures in an angular space between the loading station and the final discharge station.

15. The device set out in claim 10 wherein the radial distance from the outer fin edges to the bottom vane end edges, with respect to the central axis of the first drum, is less than the nominal length of said strands.

16. The device set out in claim 9 wherein the linear velocity of said fins with respect to said first central drum axis is equal to or greater than the velocity of the strand transfer means with respect to said second central drum axis.

17. The device set out in claim 16 wherein the relative linear velocity between the cauld surface and said second central drum axis is equal to or less than the velocity of said strand transfer means at said final discharge station.