United States Patent [19]

Woodruff

[11] **3,812,964**

[45] **May 28, 1974**

[54] **VENEER SORTER AND STACKER**

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[73] Assignee: **Cabax Mills,** Eugene, Oreg.

[22] Filed: **June 27, 1973**

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[52] **U.S. Cl.** **209/73,** 209/74, 209/75, 209/111.7

[51] **Int. Cl.** **B07c**

[58] **Field of Search** ..... 209/73, 74, 75, 111.6, 209/111.7; 214/6 F, 6 H; 271/64

[56] **References Cited**

UNITED STATES PATENTS

3,583,562	6/1971	Yock	209/74
3,717,249	2/1973	Faley	209/75

Primary Examiner—Allen N. Knowles

Attorney, Agent, or Firm—Klarquist, Sparkman, Campbell, Leigh, Hall and Whinston

[57] **ABSTRACT**

A veneer sorting and stacking machine includes photoelectric apparatus for detecting veneer sheets of greater than a preselected minimum width and an endless belt tipple which elevates to transport sheets of the minimum width into the machine. Moisture detecting means determine if individual sheets are wet or dry. An overhead ribbed belt frictionally engages the top sides of the veneer sheets and transports them along the machine on a pair of guide rails faced with low friction polymer material. Depending on the moisture determination, a given sheet is transported to a selected stacking station where rotatable gates divert it into one of a pair of bins at the station. Each stacking station includes a stacking hoist including pairs of hoist arms disposed in each bin and interconnected by chains for vertical movement with respect to a support. The chains operate to insure that as the hoist arms lower in one bin, those in the other bin are raised. The hoists are gravity operated solely by the weight of the veneer sheets stacked thereon and each hoist includes an air brake for selectively adjusting movement thereof. Electrical circuitry is provided to select the appropriate gate according to the moisture characteristic detected by the moisture detecting apparatus. Such circuitry further reverses the operation of the stacking hoists at each stacking station as a given bin is filled and causes the appropriate gate to close the the gate at the other bin correspondingly to open. Means are also provided automatically to remove the stack of sheets as soon as a bin is filled.

18 Claims, 8 Drawing Figures

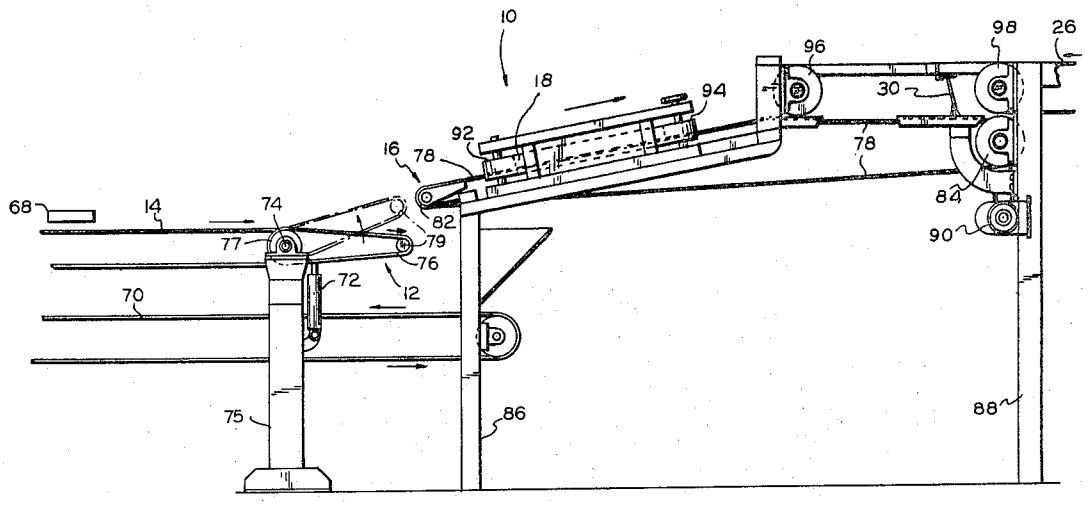


FIG. 1

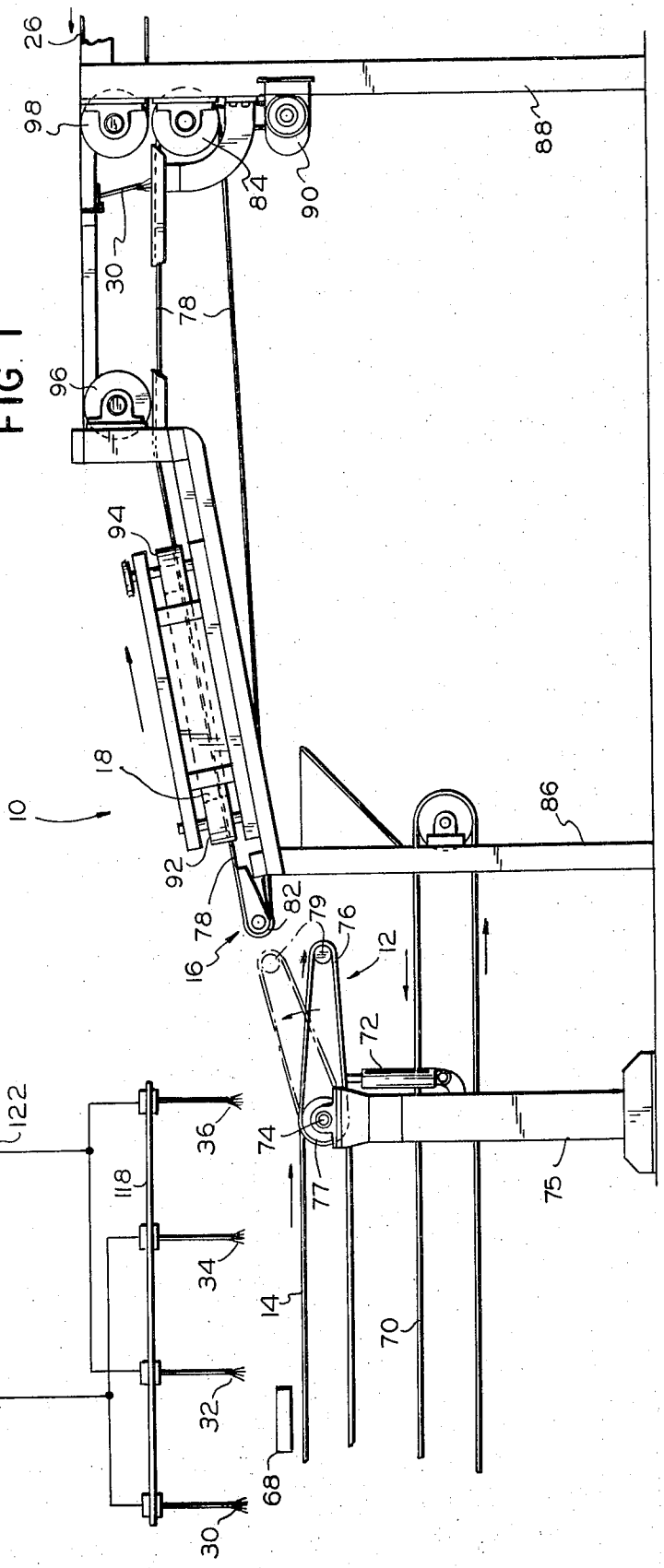


FIG. 8

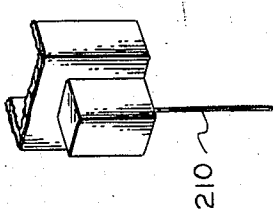
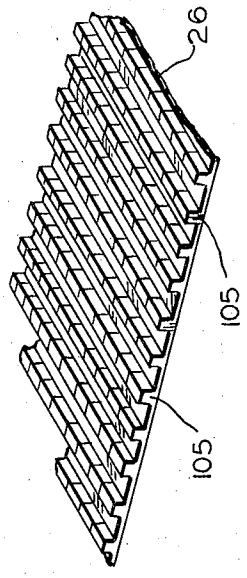


FIG. 6



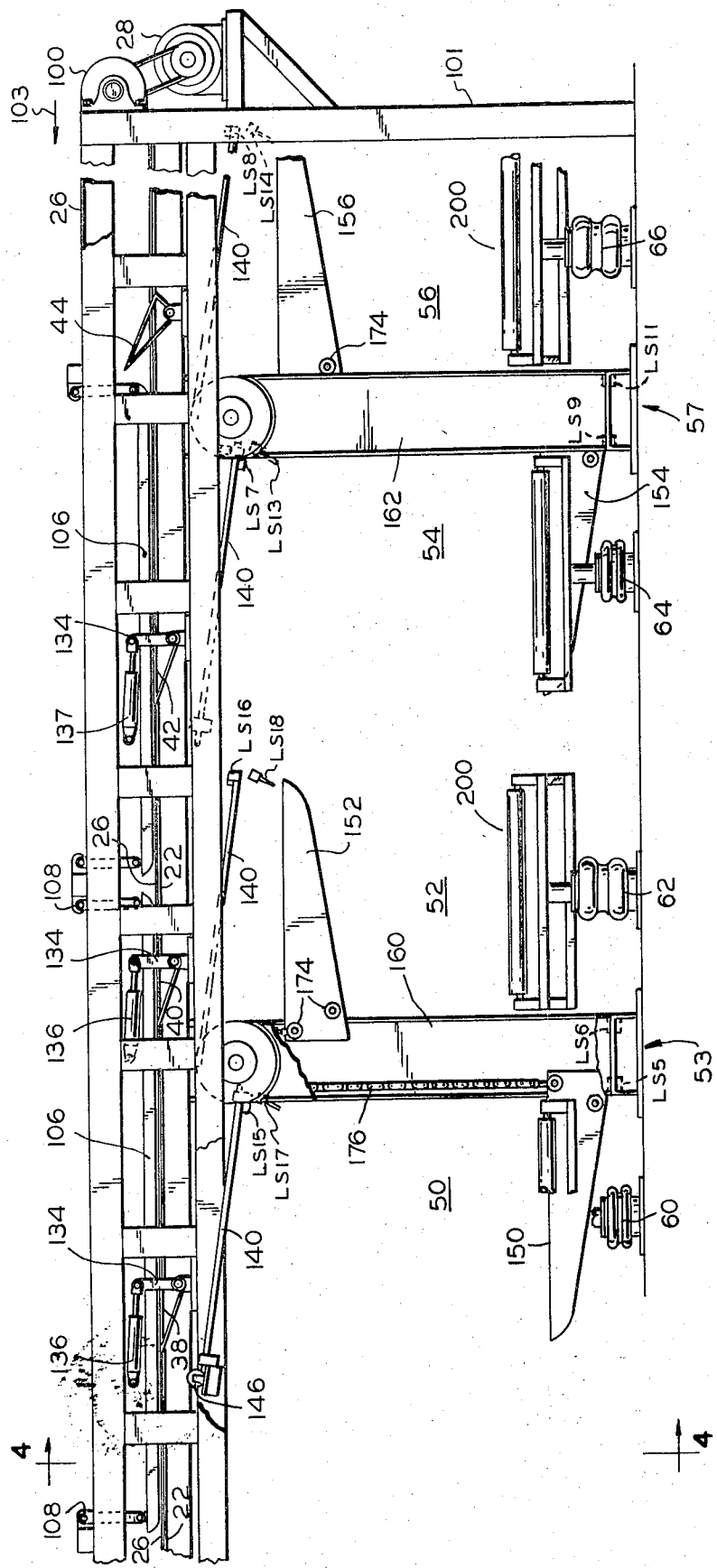

28
100
103
101
LS8
LS14
156
140
200
66
26
44
56
174
LS11
57
LS9
LS7
LS13
162
154
106
54
140
64
134
137
42
LS16
LS18
152
200
26
22
108
140
52
62
134
160
174
40
136
LS6
LS5
53
106
LS15
LS17
176
50
134
140
60
150
136
38
146
4
4
108
22
26

FIG. 2

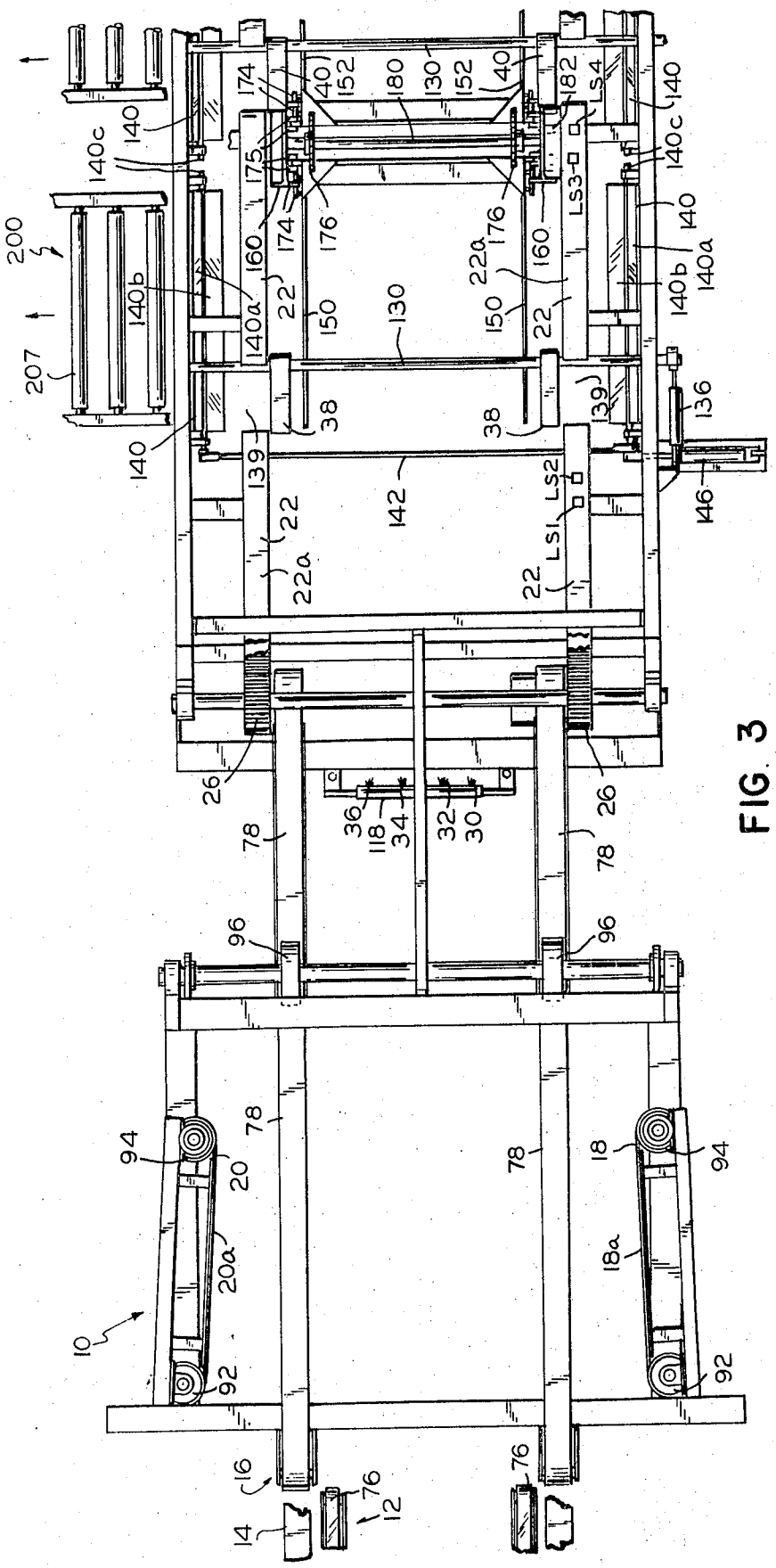

200
207
140
140c
140b
140a
174
175
160
176
40
152
180
130
182
LS4
LS3
LS2
LS1
22
22a
150
38
139
136
142
146
26
78
36
118
34
32
30
96
94
20
20a
18
18a
92
10
16
76
12
14

FIG. 3

FIG. 4

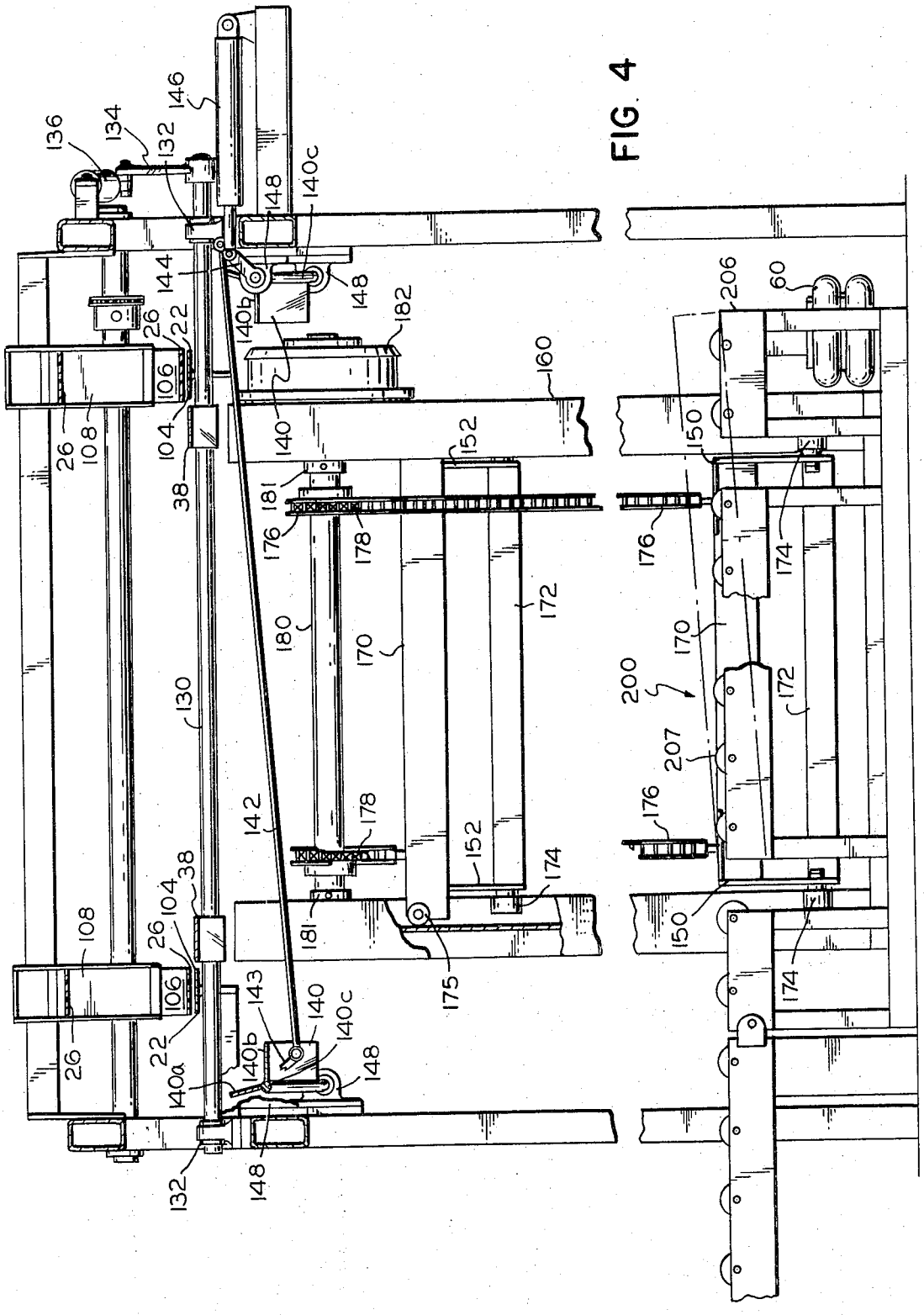
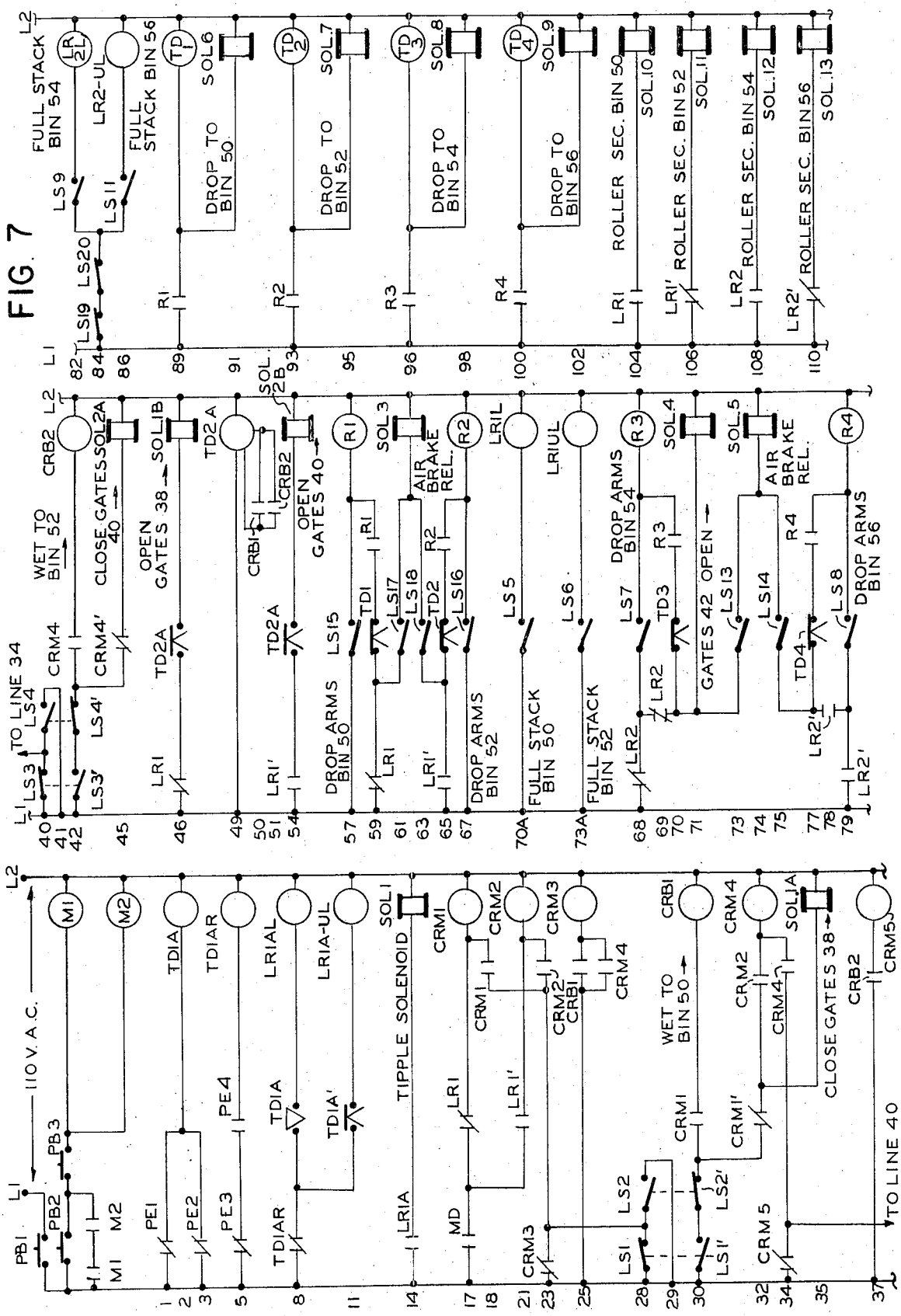

136
134
132
146
148
140c
144
140b
182
160
22
26
106
104
108
38
140
152
181
176
178
172
180
170
130
142
174
175
143
140a
206
60
150
200
207

FIG. 7


L1
L2
110 V. A.C.
PB1
PB2
PB3
M1
M2
PE1
PE2
PE3
PE4
TDIA
TDIAR
LRIAL
LRIA-UL
SOL1
TIPPLE SOLENOID
LRIA
MD
CRM1
CRM2
CRM3
CRM4
CRM5
LR1
LR1'
LS1
LS2
LS1'
LS2'
CRB1
WET TO BIN 50
CRM1'
CRM2
CRM4'
SOL1A
CLOSE GATES 38
CRB2
TO LINE 40
TO LINE 34
LS3
LS3'
LS4
LS4'
CRM4
WET TO BIN 52
CRM4'
CLOSE GATES 40
OPEN GATES 38
SOL1B
TD2A
CRB2
SOL2A
SOL2B
OPEN GATES 40
DROP ARMS BIN 50
LS15
TD1
LS17
LS18
TD2
LS16
AIR BRAKE REL.
DROP ARMS BIN 52
LS5
LR1L
FULL STACK BIN 50
LS6
LR1UL
FULL STACK BIN 52
DROP ARMS BIN 54
LS7
TD3
GATES 42 OPEN
LS13
LS14
TD4
LS8
DROP ARMS BIN 56
R1
R2
R3
R4
SOL3
SOL4
SOL5
LR2
LR2'
FULL STACK BIN 54
LS9
LR2-UL
LS11
FULL STACK BIN 56
LS19
LS20
DROP TO BIN 50
DROP TO BIN 52
DROP TO BIN 54
DROP TO BIN 56
ROLLER SEC. BIN 50
ROLLER SEC. BIN 52
ROLLER SEC. BIN 54
ROLLER SEC. BIN 56
SOL.6
SOL.7
SOL.8
SOL.9
SOL.10
SOL.11
SOL.12
SOL.13

VENEER SORTER AND STACKER

BACKGROUND OF THE INVENTION

This invention relates to a machine for sorting and stacking wood veneer sheets. Such sheets typically are formed from logs by a lathe and then are chopped into desired widths. Due to the irregularity of size and consistency of the logs, the process generates, in addition to correctly sized sheets, a variety of scrap pieces. This scrap must be removed before the remaining sheets are further processed. The veneer sheets can then be sorted according to a given characteristic, such as whether they are heart or sap, that is dry or wet. Where the sheets have been previously dried, they may be sorted according to quality grades.

Although various sorting machines have been developed for lumber, wood panels and other related products, prior to the present invention sorting of veneer sheets has been accomplished primarily by manual labor. Examples of prior machines include those disclosed in the following U.S. Pats.: Oster, No. 2,895,624; Geisler, No. 3,007,585; Hall, No. 3,430,784; and Faley, No. 3,717,249. Oster patent, No. 2,895,624, discloses an elevator for a lumber stacker which is adapted to receive lumber on arms arranged in pairs such that as one set is lowered by a motorized hoist, a corresponding set, linked by a chain mechanism, is raised.

Geisler U.S. Pat., No. 3,007,585, relates to a pallet loading machine and employs a gravity lowering hoist wherein counterweights are used to maintain the hoist at appropriate levels during the stacking procedure. Hall U.S. Pat., No. 3,430,784, discloses a stacker for sorting panels including the provision of drop arms for the stacking bins. Finally, Faley U.S. Pat., No. 3,717,249, discloses a sorter and stacker for veneer employing a vacuum conveying system to transport the sheets.

The primary object of the present invention is to provide a sorter and stacker which is capable of continuously sorting veneer sheets according to a given characteristic and then stacking such sheets at a substantial rate of speed.

It is another object of the present invention to provide a machine employing a stacking hoist which is gravity operated to obtain simplified and reliable operation of the hoist.

It is a further object of the present invention to provide a machine which accurately deposits the veneer sheets into stacking bins such that no side or end straightening of the veneer stack is necessary during or subsequent to the stacking process.

It is a still further object to provide a machine which is automatically capable of rejecting veneer sheets of less than a minimum width, while accepting for subsequent sorting and stacking sheets of such minimum width or greater.

It is another object of the present invention to provide a sorting and stacking machine which can detect one or more physical characteristics of veneer sheets as they pass into the machine and automatically stack them according to the detected characteristic.

It is yet another object of the present invention to provide a stacking machine which is capable of automatically detecting and removing a full stack of veneer sheets once they have been stacked as aforesaid.

It is another object of the present invention to provide a machine having an electrical relay memory which can accurately detect the progress of a veneer sheet through the machine properly to route the sheet regardless of the machine speed or the rate of infeed of the veneer sheets.

Other objects and advantages of the present invention will become apparent from the following specification.

SUMMARY OF THE INVENTION

My veneer sorting and stacking machine includes infeed means for feeding veneer sheets of a selected minimum size into the machine; conveying means for moving the sheets through said machine; a plurality of stacking stations located along the conveying means, each station having a pair of stacking bins for serially receiving the veneer sheets; a plurality of gate means, operable between two positions at each bin, for diverting, when in the second of such two positions, the veneer sheets from the conveying means into a selected one of the bins; and electric circuit means for selecting a station and a particular bin of that station according to a quality characteristic of the sheet, thereby to operate the appropriate gate means of one of the pair of bins at the selected station.

The infeed means includes a plurality of photoelectric cells which are employed to detect the width of the veneer sheets prior to their entering the machine. When a sheet of suitable size is detected, an endless belt tipple is actuated from a horizontal position to an inclined position such that the veneer sheet passes upward into the machine. Sheets which are too small cause the tipple to revert to or remain in its horizontal position, depositing them onto a scrap conveyor.

Acceptable sheets passed upward by the tipple are received on an inclined conveyor including a pair of aligning belts which correctly position the sheets laterally. The sheets then pass into the main conveying means of the machine which includes an overhead, ribbed endless belt adapted frictionally to engage the top side of the veneer sheets. The under side of the veneer sheets are supported on a pair of guide rails faced with a high density polymer having a very low coefficient of friction.

The infeed portion of the machine is further provided with moisture detecting means to determine if the sheets are sap (wet) or heart (dry). Based on whether the veneer sheet is determined to be wet or dry, its subsequent progress through the machine is determined. If the sheet is wet, it will move along the conveying means until it reaches a first stacking station where it is removed from the conveying means and deposited on a pair of hoist arms. If the veneer sheet is dry, it will bypass the first stacking station and move along the guide rails to a second stacking station.

Each stacking station includes a support means which defines a pair of bins on either side thereof. A chain means is entrained over the support means and is connected to a pair of hoist arms in each bin which are vertically movable with respect to the support means. During any particular period, only one of the bins at each station will be receiving veneer sheets. When the sheets approach the correct bin, a gate means located along the conveying path is electrically operated to divert them from the conveying means onto a pair of downwardly inclined drop arms. The

drop arms receive the sheet and retain it until it comes to rest. The drop arms then discharge the sheet vertically downwardly onto the hoist arms of the selected bin.

Each bin is provided with means for adjusting the hoist arm height so the level at which sheets are received from the drop arms remains substantially constant. The adjustment is accomplished by an air brake which is released when the stack of veneer is too high, thereby allowing the weight of the sheets in the selected bin to lower the hoist arms. The air brake is then reapplied and stacking continues in this manner until the selected bin contains a full stack of sheets. The gate means for that bin is then closed and the gate means of the other bin of the same station is opened to receive subsequent sheets. Thus, when one bin fills, the other bin of the pair begins receiving veneer sheets. As soon as the change from the full to the empty bin occurs, discharge means are activated to remove the stack of sheets from the full bin. The discharged or emptied bin is then available to receive sheets when the second bin becomes full. The alternating of bins continues in this manner so that no accumulator device or off time is necessary.

The machine operation is controlled by a circuit which receives an input signal from the moisture detecting means to determine the appropriate stacking station for each sheet. Included in the control circuit are a number of limit switches disposed along the conveyor means which serve as memory or tracing elements. As the sheets move along the conveyor means, the progress of each sheet is detected so that the appropriate gate means is operated at the proper time regardless of the rate of operation of the conveyor or the frequency of sheets fed into the machine.

As a sheet approaches the first stacking station, if it is to be stacked in one of the bins at that station, the control circuit applies a signal to the appropriate gate means. If a veneer sheet is to bypass the first station, a signal is generated closing the gate means of the first station. In an embodiment employing only two stations, the gate means for the last bin remains permanently open inasmuch as any sheet reaching that bin must go into it. In an embodiment wherein three or more stacking stations are employed, it is necessary to include control circuitry to allow a sheet destined for a third or subsequent stacking station to bypass all preceeding stations.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side view of the infeed section of a sorter and stacker according to the present invention.

FIG. **2** is a side view of the main section of the sorter and stacker according to a preferred embodiment utilizing two stacking stations.

FIG. **3** is a top view of the apparatus showing portions of the infeed and main section.

FIG. **4** is a sectional view taken along the line **4—4** of FIG. **2.**

FIG. **5** is a schematic drawing of the moisture detector and associated circuitry.

FIG. **6** is a fragmentary perspective view of the overhead endless belt used to convey veneer sheets along the apparatus.

FIG. **7** is a diagram of the control circuit of the illustrated embodiment.

FIG. **8** is a side view of the limit switches employed in the apparatus.

DETAILED DESCRIPTION

GENERAL ARRANGEMENT

A preferred embodiment of the machine of the present invention is shown in FIGS. **1, 2** and **3.** The machine includes an infeed section **10** which includes an endless belt tipple **12** movable from a horizontal position to an inclined position for feeding veneer sheets carried on a conveyor belt **14** to an inclined conveyor **16.** Located on each side of the inclined conveyor **16** are a pair of vertically arranged aligning belts **18** and **20** (FIG. **3**).

From the inclined conveyor **16,** the veneer sheets pass onto a pair of guide rails **22** faced with a low friction material. The sheets are conveyed through the machine on the guide rails **22** by a pair of overhead endless belts **26** driven by a motor **28** located at the end remote from the infeed section **10.** As the sheets are conveyed on the rails **22** by the belts **26,** they pass under a set of four wire brushes **30, 32, 34** and **36** (FIG. **3**). These brushes are electrically wired as shown in FIG. **5.** If a veneer sheet passing thereunder is sufficiently wet to permit a current flow between the brushes, a signal is generated designating that sheet as wet (sap). Failure to generate such a signal designates a sheet as dry (heart).

According to the detected characteristic of each sheet, selected gate means **38, 40, 42** or **44** (FIG. **2**) will be either in a horizontal or elevated position when the sheet approaches so that the sheet is diverted from the conveying means into a selected one of the stacking bins **50, 52, 54** or **56.** The operation of the gate means is indicated by the control circuit shown in FIG. **7.**

The bins **50** and **52** constitute a first stacking station **53** and receive only wet sheets, while bins **54** and **56** constitute a second stacking station **57** and receive only dry sheets. Each pair of bins **50, 52** and **54, 56** are arranged to receive sheets alternately. For example, bin **50** receives all the wet sheets until it is full. Switching then takes place and bin **52** receives the wet sheets. After switching, a filled bin is automatically emptied onto a tiltable roller section **200** by one of a series of expanding air mounts **60, 62, 64, 66** to cause the stack of veneer to roll out of the bin. When the second bin of the station is full, switching again occurs and the emptied bin again commences to receive the veneer sheets.

INFEED SECTION

Referring now to FIGS. **1** and **3,** the structure and function of the infeed section **10** will be described. Wood veneer sheets, intermixed with scraps, are received on the conveyor belt **14.** As the sheets move towards the infeed section, they pass through a set of photoelectric relays **PE1, PE2, PE3** and **PE4** indicated schematically at **68.** The photoelectric relays serve to detect the width of a veneer sheet, i.e., the dimension along the direction of travel on the conveyor belt **14.** As will be explained, when the light beam of PE1 or PE2 is interrupted, a time delay relay TD1A is started. If the sheet is of a minimum selected width, the light beam will remain interrupted allowing the delay relay TD1A to time out, generating a signal for raising the tipple **12.**

In the event that a sheet of veneer is not of the selected minimum width, the time delay relay does not time out. Accordingly, the tipple **12** is lowered and the sheet falls onto a belt **70** which conveys it to a chipper.

The tipple **12** is raised and lowered by an air cylinder **72**, which rotates it about a bearing **74** mounted in support **75**. The tipple **12** comprises two endless belts **76** mounted thereon. The belts **76** rotate in the indicated direction about pulley wheels **77** and **79**. In its inclined position, tipple **12** will feed a veneer sheet of a selected width into the infeed section **10** of the machine proper.

As best seen in FIG. **3**, a pair of inclined belts **78** receive the sheets from the inclined tipple **12**. The belts **78** rotate in the same direction and at approximately the same speed as the tipple belts **76**. Belts **78** are mounted on pulley wheels **82** and **84** which are attached to machine supports **86** and **88** respectively. A motor **90**, typically ½ horsepower, drives the pulley wheel **84** for driving the belts **78**. A similar motor (not shown) is utilized to drive the tipple belts **76**.

As the sheets pass onto the inclined belts **78**, it is necessary to insure that they are properly aligned before entering the main conveying section of the machine. Aligning belts **18** and **20** (FIG. **3**) are provided for this purpose. The belts **18** and **20** rotate about pulley wheels **92** and **94** which have a vertical axis of rotation. Belts **18** and **20** are located on each side of the veneer sheets as they travel up the inclined belts **78**. The downstream pulley wheels **94** are disposed inwardly of the wheels **92** such that the distance therebetween is just slightly greater than the length of the veneer sheets. The inwardly disposed reaches **18***a* and **20***a* of the belts **18** and **20** travel in the same direction as do the upper reaches of the belts **78**. Thus, any misalignment of the sheets as they travel up the infeed section is corrected due to the buffeting of their end portions as they come in contact with the aligning belts.

A pair of rollers **96** are positioned near the midpoint of the inclined conveyor **16** and on opposite sides thereof. Rollers **96** serve to guide the veneer sheets as they reach the level of the main conveyor system.

CONVEYING MEANS

The conveying means for the main section of the machine includes the pair of endless belts **26** (FIGS. **1** and **2**) which rotate about pulley wheels **98** and **100** located at the infeed and end sections of the machine, respectively. The motor **28**, which is mounted on a rear support **101**, drives the pulley wheel **100** for rotating the belts **26** in the direction indicated by arrow **103**. Motor **28** is desirably of 1 horsepower capacity and, in the preferred embodiment, is arranged to drive the belts **26** at a rate of approximately 300 feet/minute.

Belts **26** are desirably three ply and 3 inches wide and of the type manufactured by United States Rubber Company under the trademark RIBFLEX. As indicated in FIG. **6**, belting of this type is smooth on one side, but comprises a plurality of transverse ribs **105** on the other side. Each of the ribs **105** is slit longitudinally of the belt so that all or a portion of each rib may flex as it comes in contact with a veneer sheet, thereby to provide good frictional contact between the belts and the veneer sheets.

Each belt **26** is disposed above the corresponding steel rail **22** for engaging the top sides of the veneer sheets. The steel rails are faced with a low friction material or facing **104** (FIG. **4**) marketed under the name "Hi-Moly" by Impact Plastics Company, Gastonia, N.C. This material is desirably a high molecular weight thermoplastic material, having a molecular weight greater than 3 million, and is made up of extremely long, nearly branch-free molecular chains. As such, it is characterized by an extremely low coefficient of friction, about 0.11, high resistance to repeated impact and high abrasion resistance. Typically, it has a Rockwell hardness of R45, a specific gravity of 0.945 and a density of 29 cu.in./lb. The rails **22** are disposed along the length of the machine in discontinuous sections. The veneer sheets are supported on the rails as they are pulled along by the overhead belts **26**.

The overhead endless belts **26** engage the veneer sheets as they pass from the inclined belts **78**. The ribs **105** on the belts frictionally contact the top surfaces of the veneer sheets and by such contact, pull them along the length of the machine on the low friction rails **22**.

In order to prevent any slipage between the veneer sheets and the belts **26**, hold down bars **106** (FIG. **2**) are suspended along the length of the machine from pivotable arms **108** mounted on the machine frame. The bars **106** are positioned inside the endless belts **26** and apply pressure to the belts to maintain firm contact between the ribs **105** and the veneer sheets. The belts are therefore vertically self-adjusting to any variation in sheet thickness and thus will not permit the sheets to slip as they are pulled through the machine.

SORTING OPERATION

In the preferred embodiment, sorting of the veneer sheets is according to whether a given sheet is heart or sap, that is dry or wet. A series of veneer sheets fed into the machine will differ in this characteristic due to the different type and size of logs fed to the lathe, and one of the purposes of the instant invention is to sort such sheets into separate stacks to minimize subsequent drying time.

Sorting is accomplished by use of moisture detecting means (FIGS. **3** and **5**) which include a set of four wire brushes **30**, **32**, **34** and **36** mounted transversely of the machine frame on a cross bar **118**. The brushes are mounted so as to contact the top side of the veneer sheets as they enter the main section of the machine.

As indicated by the schematic portion of FIG. **5**, the brushes form part of an electrical circuit and are wired in a series-parallel manner. That is, brushes **30** and **34** are connected to one side of a low voltage DC source **119** while brushes **32** and **36** are connected via a relay **120** and an amplifier **122** to the other side of the source **119**. When the brushes strike the top surface of a veneer sheet, if the sheet is wet or contains sap, current will flow between one or more brushes of each of the sets **30**, **34** and **32**, **36**. This current flow is amplified by amplifier **122** to a level sufficient to operate the relay **120** to set the control circuitry for properly routing the veneer sheet. In the event that a veneer sheet is dry, no current will flow through the circuit and the relay **120** will remain inoperative. The degree of wetness required to operate the relay can be adjusted by a variable resistance **124**.

The present invention does not have to be used to sort veneer sheets by moisture content. It may be used,

for example, to sort dried veneer. In such case the wire brushes and associated circuitry of FIG. 5 are omitted and sorting accomplished according to grades of the dry veneer. Typically, such a sort would include three different grades and thus would require a third stacking station. In such a case, the information signal as to the grade of each sheet may be supplied to the control circuitry via a manually generated input signal from a human grader positioned near the machine.

THE STACKING STATIONS

Once a veneer sheet has been engaged by the conveying belt **26**, it is pulled along the facing **104** of the rails **22** until it reaches the designated one of stacking stations **53** and **57**. As a sheet approaches the stacking station corresponding to its detected characteristic, the appropriate gate means **38, 40, 42** or **44** diverts the sheet from the conveying means.

Referring to FIG. **4**, the arrangement of gate means **38** is shown in detail. All the gate means, except the last gate means **44**, are of similar arrangement. Each gate means comprises a triangular cross-section member positioned along the conveying path just inside of the rails **22**. Gate means **38** is mounted on the frame on a rod **130** which is journaled into each end of the frame for rotation in a pair of bearings **132**. Attached to the rod **130** at one end thereof is a lever arm **134** connected to an electrically operable air cylinder **136**. When activated, the air cylinder **136** extends, causing the arm **134** to rotate the rod **130** thereby to raise the gate means **38** attached thereto.

The air cylinder **136** is actuated by a spring centered double solenoid four-way valve (not shown). It will therefore remain in its last position, either raised or lowered, until operated to a new position. The same is true of the air cylinder for gate means **40**. Gate means **42** (FIG. **2**), however, has an air cylinder **137** which differs as will be explained subsequently, while gate means **44** requires no air cylinder at all, since it remains in the elevated position at all times.

When in an elevated position, a gate means will divert a veneer sheet downwardly from the guide rails **22**. In this regard it should be noted that the guide rails **22** are comprised of segments **22***a* which have a gap **139** between each segment approximately equal to the length of the gate means (FIG. **3**). Thus, when the gate means are in the horizontal position, they serve as a support for the sheets as they pass over the gap **139**. When in an elevated position, the gate means serve to remove a veneer sheet from the rails **22** by diverting it downwardly through the gaps **139** in the rails and out of engagement with the belts **26**.

A veneer sheet diverted from the conveying means by the action of an elevated gate means, such as gate **38** in FIG. **2**, proceeds downwardly onto a pair of drop arms **140**. The drop arms are generally L-shaped in cross section, having a normally upstanding guide surface **140***a* and a receiving surface **140***b* mounted on a pivotable bar **140***c* rotatable in bearings **148**. Additionally, the arms are inclined downwardly in the downstream direction at an angle substantially equal to the angle at which the sheets are deflected from the conveying means. Thus, a sheet will slide along the surface **140***b* of the arms **140**, being guided by the surface **140***a*, until the entire sheet has left the conveying means and is resting on the surface **140***b*.

As best seen in FIG. **4**, the drop arms **140** are linked together by a transverse rod **142** which is pivotably connected at one end to a crank **143** and at its opposite end by a lever **144** to an electrically operable air cylinder **146**. The other end of the lever **144** is attached to bar **140***c* which is journaled in bearings **148** in the frame for rotation therein. The drop arms **140** are thus rotated simultaneously from the position shown in FIG. **4**, the retaining position, to a releasing position. In the releasing position, a veneer sheet positioned on the drop arms will be unsupported so that it falls by the force of gravity into the stacking bin.

As will be explained in connection with the control circuitry, each pair of drop arms **140** have a limit switch **LS15, LS16, LS7** and **LS8**, respectively, located at the downstream ends thereof such that they are activated by the sheets only when the sheets rest completely on the drop arms. Activation of the respective switch operates the respective air cylinder **146** causing the rotation of the drop arms **140** from their retaining position to their releasing position. As a sheet falls into the stacking bin, the switch is deactivated and, after an appropriate delay to insure that the sheets clear the drop arms, they reset in preparation for receiving the next sheet.

In this manner the veneer sheets are removed from a conveying system which may operate at speeds of up to 300 feet/minute and are brought to substantially a complete rest on the drop arms. By so doing, the sheets will, when released, fall into the stacking bins with little or no horizontal component of velocity, i.e., the sheets will fall straight down. Such a result is desirable in that it eliminates the need for having any tamping or end straightening devices within the bin area to maintain the edges of the sheets in alignment and thereby simplifies the overall mechanism.

STACKING HOIST

Referring now to FIGS. **2** and **3**, it will be seen that beneath each pair of drop arms **140** there are a pair of horizontally extending hoist arms **150, 152, 154** and **156**. The hoist arms are located, respectively, in bins **50, 52, 54** and **56**, the bins being defined by an H-section stacking station support **160** in the case of station **53** and **162** in the case of station **57**. Since both of the stacking stations **53** and **57** shown in FIG. **2** are constructed substantially identically, for simplicity it is necessary only to describe the structure of stacking station **53**, including bins **50** and **52**.

The hoist arms **150, 152** are arranged for vertical reciprocal movement with respect to their support **160**. As shown in FIG. **4**, each pair of hoist arms are connected by cross braces **170** and **172**. Mounted in the cross braces are roller bearings **174** which permit the arms **150, 152** to move smoothly up and down the flanges of support **160**. Side thrust rollers **175** are provided to contact the web of the support.

The hoist arm pairs **150** and **152** are interconnected by chains **176** (FIGS. **2** and **4**) attached to each arm assembly and entrained over a pair of chain sprockets **178** mounted for rotation on a shaft **180**. The hoist arm pairs **150** and **152** are thus operatively interconnected in a teeter-totter like fashion. As the hoist arm pair **150** is raised on the support **160**, the pair **152** will be lowered, and vice versa.

The sprocket shaft **180** is journaled in the support **160** at each side thereof and mounted in bearings **181**.

An air brake **182** is mounted at one end of the shaft **180** for controlling the rotation of the shaft. The air brake **182** is of a standard pancake type widely available. One suitable for the purpose provides 4,300 in.-lbs. of torque and is manufactured by Horton Manufacturing Co., Minneapolis, Minn., under the trademark AIR-CHAMP. The shaft **180** extends through an aperture provided in the brake. When activated, the brake prevents rotation of the shaft.

Considering the operation of the hoist arm assembly, it will be apparent that if bin **52** is receiving wet veneer sheets via gate means **40** and drop arms **140**, the sheets will be deposited on the hoist arms **152**. As successive sheets are deposited on the arms **152**, the interconnection of the pairs **150** and **152** cause the hoist arms **152** to move downwardly due to the weight of the sheets and the hoist arms **150** to move correspondingly upwardly. Such action is selectively prevented by the air brake **182**.

When a stack of sheets on the arms **152** reaches a selected height, the brake **182** is released. The releasing is accomplished by the accumulated veneer sheets reaching a height sufficient to strike a limit switch as will be hereinafter described. When operated, the limit switch releases the air brake **182** allowing the weight of the veneer sheets on the arms **152** to move them downwardly until the limit switch is opened. The brake **182** is then reapplied again to prevent movement of the hoist arms. In this manner, the sheet receiving level of a bin is automatically maintained within a selected range without motorized equipment.

As is best seen from FIG. **4**, when the hoist arms **150**, for example, reach the bottom of support **160**, the bottom sheet of the stack will contact a tiltable roller section **200**. Similar roller sections are located in the bottom of each bin with provision made to accommodate the respective pair of hoist arms. In a first position, the roller sections **200** are horizontally disposed as shown. When a hoist air pair reaches the bottom of its permissible travel, its lower cross brace **172** actuates a respective one of the limit switches, LS5, LS6, LS9 and LS11. These switches each operate a respective rubber diaphragmed air cylinder or air mount **60, 62, 64** and **66**. These air cylinders or air mounts are of known construction and, for example, a Firestone Air Mount has been found satisfactory for this purpose. Cylinder **60**, when expanded, lifts the end **206** of the roller section **200** vertically upwardly a distance of approximately 3 inches above its horizontal position, as shown in phantom in FIG. **4**.

As the roller section **200** rises, it lifts the veneer stack by an amount sufficient to clear the hoist arms **150** and to initiate movement of the stack down inclined rollers **207**. In this manner, a full stack is removed from each bin as soon as the hoist arms operate the respective limit switch LS5, LS6, LS9 or LS11. A signal from the respective switch is also utilized to change the stacking operation from the full bin to the other bin of the pair, as will be more fully explained hereinafter.

CONTROL CIRCUIT AND MACHINE OPERATION

The control circuitry for the apparatus is disclosed in FIG. **7**. A motor relay M1 is connected across a 110 volt AC line, for operating motor **90** (FIG. **1**) for driving the belts **78**. Similarly, a motor relay M2 is connected to the voltage source for operating motor **28** (FIG. **2**) to drive the belts **26**. A similar relay (not shown) is utilized for the motor for the tipple belts **76**.

Referring to circuit lines 1 and 3 of FIG. **7**, there is shown the normally closed contacts of photoelectric relays PE1 and PE2, which are disposed in parallel and connected to a time delay relay TD1A. At line 5 further contacts PE3 (normally closed) and PE4 (normally open) are disposed across the voltage source in series with a delay relay TD1AR. The contacts for the delay relay TD1A are shown at line 8 as normally open and at line 11 as normally closed. The contacts for TD1AR are located at line 8.

The circuit thus far described determines the width of the veneer sheets prior to their reaching the tipple **12** of FIG. **1**. As the veneer nears the tipple on the conveyor **14**, it breaks a light beam from either or both of the photoelectric relays PE1 and PE2. This closes the contacts on lines 1 and 3 which were held open by the light beams, thereby energizing the time delay relay TD1A which is an adjustable delay relay for timing out a selected veneer width. If a veneer sheet is of a selected width or more, then the delay relay will time out and its contacts on line 8 will close while the contacts on line 11 will open. If the sheet is of insufficient width, the delay relay will not time out, and its contacts remain in their initial position.

As the veneer progresses on the belt **14**, it next breaks a light beam from relay PE3 allowing its contacts (line 5) to close, thereby energizing a second time delay relay TD1AR through PE4 whose contacts are held closed by its light beam. Activation of the relay TD1AR closes its contacts on line 8, thereby energizing either a latch relay LR1AL or an unlatch relay LR1A-UL, depending on the position of contacts TD1A on lines 8 and 11. If TD1A (line 8) is closed, indicating a minimum width sheet, LR1AL is energized closing its contacts on line 14. This activates a solenoid SOL1 (line 14) energizing the air cylinder 72 of FIG. 1 to raise the tipple **12**. When the veneer strikes the light beam of PE4, line 5 is opened and TD1AR deenergized for resetting the circuit.

When the tipple **12** has been placed in its raised position as just described, it remains there due to the latching action of contacts LR1A on line 14. If the next sheet of veneer is greater than minimum width, the tipple **12** merely remains in place. When a sheet which is undersized is detected, relay TD1A (line 2) does not time out and its contacts on line 11 will remain closed. This causes unlatch relay LR1A-UL to be operated when the contacts TD1AR are closed. Operating LR1A-UL opens the contacts LR1A on line 14 deenergizing the solenoid SOL1 allowing the tipple **12** to drop from its elevated position back to its horizontal position so that the undersized veneer will pass onto the scrap conveyor **70**.

The photoelectric relays PE1 and PE2 are in parallel to prevent malfunction of the machine in the event a knot hole is present in a veneer sheet. Their light beams are separated by a distance sufficient to prevent both relays from being affected by a knot hole. Thus the circuit allows either photoelectric relay PE1 or PE2 to operate time delay relay TD1A (line 2) to cause the tipple **12** to be raised.

Referring now to circuit lines 17 through 21 of FIG. **7**, the moisture detecting and sorting circuitry is disclosed. On line 17 are normally open contacts MD,

which are the contacts of moisture detecting relay **120** of FIG. **5.** When the moisture detecting brushes pass current through a wet sheet of veneer contacts MD are closed. Conversely, if no current passes through the veneer sheet, these contacts remain open. Provided on lines **17** and **21** are a pair of contacts LR1 and LR1', respectively corresponding to a latch relay LR1L on line **70A.** Initially, the contacts LR1 are normally closed, while contacts LR1' are normally open. If a wet veneer sheet is detected, contacts MD and LR1 provide a signal to energize memory relay CRM1 (line **17**). This relay has normally open contacts CRM1 on lines **18** and **30** and normally closed contacts CRM1' on line **32.** When relay CRM1 (line **17**) is operated, its contacts on lines **30** and **32** change state. CRM1 is then maintained in this condition by its contacts CRM1 on line **18.** This results in sending a veneer sheet to bin **50** as will now be described.

Referring to FIG. **3,** it will be seen that there are a pair of limit switches LS1 and LS2 disposed along the conveying means in the path of the veneer sheets. As shown in FIG. **8,** these limit switches have a whisker contact **210** which is adapted to be struck by the veneer sheets. Each switch has a pair of ganged contacts available, one normally open and the other normally closed. When a wet veneer sheet strikes the first limit switch LS1, located approximately 1 foot ahead of gate means **38,** LS1' closes on line **30** while LS1 opens on line **28.** Since LS2' (line **30**) is normally closed, it thereby completes a circuit through LS1', LS2' and CRM1 to operate relay CRB1. Operating CRB1 closes its contacts on lines **25** and **50.** This energizes a time delay relay TD2A (line **49**) closing contacts TD2A (line **46**) to energize solenoid SOL1B for opening gate means **38.** Solenoid SOL1B operates air cylinder **136** (FIGS. **2** and **4**) for this purpose. The time delay relay TD2A (line **49**) is utilized to insure opening of the gate means by keeping the opening signal present for a time somewhat longer than necessary. When the delay relay times out, contacts TD2A open, deenergizing SOL1B. The contacts CRB1 (line **25**) operate CRM3 opening its contacts on line **23,** thereby deenergizing CRM1.

The wet veneer having caused gate means **38** to open next strikes limit switch LS2, located approximately several inches further down the conveyor path from LS1. This causes LS2 (line **28**) to close and LS2' (line **30**) to open. Closing LS2 on line **28** provides a sealing circuit for CRM1 on line **17** and CRM2 on line **21** until CRM3 on line **23** is again closed. Opening LS2' on line **30** deenergizes CRB1 opening its contacts on lines **25** and **50.** Opening the contacts on line **25** deenergizes relay CRM3. When a wet sheet strikes LS2, the effect is thus to reset the control circuit in preparation for the next veneer sheet. Gate means **38** will remain open, however, due to the fact that its cylinder **136** is operated by a spring-centered double solenoid containing a four-way valve. Such a cylinder remains in its last position until positively operated to a new position.

When bin **50** contains a full stack of wet veneer, the latch relay LR1L on line **70A** is operated by limit switch LS5 as will be explained. This reverses the normal positions of contacts LR1 and LR1' on lines **17** and **21.** Thus, LR1 on line **17** becomes normally open while LR1' on line **21** becomes normally closed. This is effective to transfer stacking of wet sheets from bin **50** to bin **52,** as will now be explained. When LR1' is normally closed, relay CRM2 (line **21**) rather than CRM1 (line **17**) is operated by the closing of moisture detector contacts MD on line **17.** Since CRB1 is not energized, no opening signal is generated for gate means **38.**

When the wet sheet strikes LS1, it again closes LS1' (line **30**). However, this now completes a circuit through contacts CRM1' (line **32**) to solenoid SOL1A on line **35.** SOL1A is effective to close gate means **38.** Additionally, since CRM2 has been energized, its contacts on line **32** complete a circuit to energize memory relay CRM4. The CRM4 relay has contacts CRM4 on line **42** and CRM4' on line **45,** the latter being normally closed. Energizing relay CRM4 closes contacts CRM4 and opens contacts CRM4'. This situation is maintained as relay CRM4 is sealed in by contacts CRM5 (line **34**) and CRM4 (line **34**). Thus when a wet sheet strikes LS1, relay CRM4 is energized presetting further portions of the control circuit and also operating solenoid SOL1A to close gate means **38.**

The wet sheet remains on the rails **22** past bin **50** until it reaches limit switches LS3 and LS4 which are disposed along the conveying path approximately 1 foot in front of gate means **40.** When the veneer sheet strikes LS3, it closes LS3' on line **42,** completing a circuit to relay CRB2 via LS4' and contacts CRM4. Relay CRB2 has its contacts on lines **37** and **51.** The contacts on line **51** operate the time delay relay TD2A which has a pair of normally open contacts on line **54.** Since LR1' (line **54**) is closed, the delay contacts complete the circuit to activate solenoid SOL2B. SOL2B operates air cylinder **136** to elevate gate means **40.** When the wet veneer sheet next strikes LS4, the control circuitry is reset in preparation for the succeeding sheet of veneer in the same manner as was described for gate means **38.**

Summarizing the operation of the stacking station **53,** it will be apparent that if bin **50** is to receive wet veneer sheets, the contacts LR1 on line **17** will be normally closed. In that case, when the veneer sheet strikes LS1, the gate means **38** will be raised and the veneer sheet will be diverted downwardly onto the drop arms **140** of bin **50.** On the other hand, if bin **52** is to be utilized for the wet veneer, gate means **38** will be closed when the veneer sheet strikes LS1 and gate means **40** will be opened when the veneer sheet strikes LS3. It will be observed that by employing a limit switch memory system for operating the gate means, reliable operation is obtained regardless of the rate of feed of the veneer sheets through the stacker. This is because operation is dependent upon the sheets reaching specified locations along the conveying means before activating the appropriate solenoids.

Turning now to the stacking station circuitry, the operation of the drop arms **140** will be considered. Located at the lower end of the drop arms are limit switches LS15, LS16, LS7 and LS8 corresponding, respectively, to bins **50, 52, 54** and **56.** When a veneer sheet is diverted downward by a gate means, it passes onto the drop arms in the manner previously described. When the sheet is fully disposed on the drop arms, its leading end strikes one of the limit switches LS15, LS16, LS7 or LS8, activating the corresponding pair of drop arms.

FIG. **7,** line **57,** shows the circuitry for bin **50.** When LS15 is closed, it completes a circuit to relay R1 having contacts on lines **59** and **89.** When R1 is operated, its contacts on line **89** close, energizing time delay relay TD1 and solenoid SOL6 on line **91.** SOL6 actuates air

cylinder 146 (FIG. 4) causing the drop arms 140 to rotate from their retaining position to their releasing position. The time delay relay TD1 seals in relay R1 by its contacts on line 59 to insure that the veneer sheet has dropped clear of the arms 140 before allowing contacts R1 on line 89 to open. When deenergized, the drop arms return to their initial position. The drop arm operation described is identical for all bins, the specific circuitry for each bin being identified in FIG. 7.

STACKING HOIST CIRCUITRY

Referring now to FIGS. 2 and 7, the alternating operation of the stacking bins 50 and 52 and the associated control circuitry will be described. Assuming an initial operating state wherein bin 50 is utilized for stacking wet veneer sheets, the hoist arms 150 will initially be located at the top of the support 160 while hoist arms 152 will be at the bottom. This is just opposite of the positions shown in FIG. 2. As sheets enter the conveying means, the wet ones are diverted by gate means 38 onto the drop arms 140 of bin 50. The drop arms 140 deposit the sheets onto the hoist arms 150. As the sheets accumulate on arms 150, the height of the stack will rise until a limit switch LS17 is operated. LS17 is suspended from the frame of the machine and is positioned to be operated when the stack of sheets reaches a selected height.

When LS17 is operated, a circuit is completed on line 61 (FIG. 7) to a solenoid SOL3 which controls the air supply for the air brake 182 of FIG. 4. Operating LS17 releases the air brake and allows the weight of the veneer sheets on the arms 150 to lower them. This causes the empty hoist arms 152 in bin 52 to rise. As soon as the arms 150 have dropped a distance sufficient to let the limit switch 17 clear the stack, the circuit opens to reestablish braking action by the air brake 182. However, there is a mechanical delay built into the braking operation which is desirably utilized so that each additional veneer sheet does not cause the air brake to be released and reapplied. It takes approximately 4 to 6 sheets deposited on a pair of hoist arms before a height adjustment will occur.

After a period of operation, the stacking arms 150 will reach the bottom of support 160 indicating that they contain a full stack of wet sheets. Mounted on the support means 160 near the bottom is the limit switch LS5 which is operated by the brace 172 when the arms 150 reach the bottom of the support 160. When closed, LS5 completes a circuit on line 70A to the latch relay LR1L. Operation of this relay reverses the normal state of contacts LR1 and LR1′ on lines 17 and 21 so that LR1′ becomes normally closed while LR1 becomes normally open. This results in transferring the stacking operation from bin 50 to bin 52 as has been hereinbefore described. Relay LR1L further operates the air cylinder 60 for raising the roller section 200 by operating solenoid SOL10 on line 104. In addition, operation of LR1L closes contact LR1′ on line 65 to preset limit switch LS18 for controlling the air brake when the stack height in bin 52 requires adjustment.

It will now be apparent that once the hoist arms 150 reach the bottom, the stacking operation switches from bin 50 to bin 52 while the full stack of veneer sheets is removed from bin 50 by operation of the roller section 200. Stacking then continues in bin 52 until it is full, at which point the stacking operation switches back to bin 50, which, having been emptied, is again ready to receive wet sheets.

To accomplish return switching, bin 52 is provided with a limit switch LS6, located next to LS5 on the support 160 and adapted to be engaged by the respective cross brace for arms 152 when they are in their lowermost position. When bin 52 is full and LS6 is closed, unlatching relay LR1UL on line 73A is operated. This unlatching relay reverts operation of the stacking back to the bin 50 by again reversing the normal state of the contacts LR1 and LR1′ on lines 17 and 21. It also causes bin 52 to be emptied in the same manner as described for bin 50. The stacking at station 53 continues in this manner with the bins alternately receiving the wet veneer sheets.

DRY SHEET STACKING

Returning now to line 30 of FIG. 7, the operation of the machine when a dry veneer sheet is detected will be explained. Since the contacts MD (line 17) remain open for a dry sheet, nothing happens until the sheet contacts switch LS1 in front of gate means 38. Operating LS1 closes LS1′ on line 30 energizing the solenoid SOL1A on line 35 to close gate means 38. Since relay CRM2 (line 21) is not energized, contacts CRM2 on line 32 remain open. As a result, relay CRM4 on line 32 is not energized as was the case for a wet veneer sheet going to bin 52.

A dry veneer sheet continues on the conveying means until it next strikes limit switch LS3 in front of gate means 40. This operates LS3′ on line 42. Since relay CRM4 (line 32) is not energized, contacts CRM4 on line 42 are open while CRM4′ (line 45) are closed. This completes a circuit to solenoid SOL2A for closing gate means 40. Thus, as a dry sheet passes along the conveying means, the fact that it is a dry sheet has been stored in a relay "memory" and each of the wet station gate means are closed before the dry sheet reaches them so that the sheet bypasses the wet stacking station 53. As with the wet veneer sheets, striking limit switches LS2 and LS4 serves to reset the circuitry in preparation for the following sheets.

A dry veneer sheet having passed the wet stacking station 53 continues on toward gate means 42 of bin 54. In the illustrated embodiment with only two stacking stations, all veneer sheets approaching the second stacking station 57 must go into one of the bins 54 and 56. Thus, the circuitry required for operating the second or dry station 57 is considerably simpler than that required for the first stacking station. For example, it will be apparent that if a dry veneer sheet does not enter bin 54, it must enter bin 56. Accordingly, in this embodiment gate means 44 is always maintained in an elevated position and requires no actuating circuitry or air cylinder. Gate means 42 is operated by the air cylinder 137. However, this cylinder is dissimilar from cylinders 136 used to operate gate means 38 and 40. Cylinder 137 is a one-way spring biased cylinder, which keeps gate means 42 normally closed unless operated.

Considering the circuitry at lines 68–75 of FIG. 7, the operation of gate means 42 will be explained. When bin 54 is to receive the dry sheets, the contacts LR2 on lines 68 and 69 are closed. This operates the one-way cylinder 137 by means of solenoid SOL4 on line 71. This solenoid maintains gate means 42 in its elevated position as long as the LR2 contacts are closed.

When the hoist arms **154** of bin **54** reach the bottom, a limit switch LS9 is operated for switching operation to bin **56.** This closes contact LS9 on line **82.** In series with LS9 are limit switches LS19 and LS20 which are normally closed. As a dry sheet approaches gate means **42,** it strikes limit switches LS19 and LS20 opening their contacts on line **84.** This prevents the operation of latch relay LR2L if a veneer sheet is close enough to gate means **42** to be possibly caught by its closing. If no sheet is present or when a sheet has passed, the circuit is closed to operate relay LR2L on line **82.** Operation of this relay causes its contacts to change their normal state. Contacts LR2 on lines **68** and **69** become normally open and the contacts LR2′ on lines **78** and **79** become normally closed. When this occurs, solenoid SOL4 becomes inoperative and gate means **42** is closed by the spring offset of cylinder **137.**

In addition to switching the stacking operation from bin **54** to bin **56,** latch relay LR2L also operates the air cylinder **64** and respective roller section **200** for discharging the full stack. Subsequent dry sheets are received in bin **56** and stacked on hoist arms **156.** As will be apparent, the stacking operation reverts back to bin **54** when bin **56** is full and limit switch LS11 is actuated causing the relay LR2UL on line **86** to be operated. Again this switching cannot occur if a sheet is near the gate means **42** since limit switch LS19 and/or LS20 will be open.

OPERATIONAL SUMMARY

While it is believed that the foregoing detailed specification, taken in connection with the accompanying drawings, completely and accurately describes the structure and operation of the preferred embodiment, a brief summary of the machine operation will now be given.

A veneer sheet enters the stacking machine, if it is determined by photoelectric means, to be of a minimum width. Such sheets are received into the machine on an inclined endless belt conveyor **16** from a tipple **12.** The sheets pass under a moisture detecting circuit employing a set of wire brushes **30, 32, 34** and **36** which attempt to pass current through the veneer sheets. Wood normally being a poor conductor of electricity will not pass current unless it is wet.

In the event that a current does flow through the sheet indicating a preset degree of wetness, a pair of contacts MD are closed which set control circuitry so that the sheet will be routed to one of the bins **50** or **52** of the first stacking station **53.** When either of the bins **50, 52** of the first stacking station **53** become filled, a latch relay LR1L or LR1UL is operated causing the gate means associated with the full bin to close and the gate means associated with the other bin at that stacking station to open.

In the event that a dry sheet is detected, the gate means of both bins of the first stacking station **53** are closed and the sheet is conveyed on the guide rails **22** to the second stacking station **57** where it will pass into either bin **54** or **56.**

While the above constitutes a preferred embodiment of the present invention, as hereinabove mentioned it is possible to provide a sorting and stacking machine which will sort dry veneer sheets according to grade depending upon an information signal supplied by a human grader positioned near the infeed portion of the stacking machine. For such an operation, three or more stacking stations are desirable. This necessitates additional circuitry for the second and subsequent stacking stations similar to that provided for the first stacking station to close the gate means for sheets which are to bypass the respective station. In view of the explanation of the circuitry given herein, such modifications for intermediate stacking stations will be obvious to the artisan and a discussion thereof will thus not be included.

I claim:

1. A machine for sorting and stacking wood veneer sheets comprising:

first detecting means for identifying veneer sheets of a minimum selected size;

infeed means responsive to said first detecting means for feeding into said machine only veneer sheets having said minimum selected size;

second detecting means for identifying which one of two or more characteristics each selected veneer sheet has;

an overhead conveying belt frictionally engaging the top side of the selected veneer sheet for conveying said selected sheet through said machine;

low friction faced rails for supporting said selected veneer sheet as it is conveyed by said endless belt;

a plurality of stacking bins for receiving the selected veneer sheets;

a plurality of gate means, electrically operable, positioned along said rails for diverting the selected veneer sheets from said rails into said stacking bins; and

electric circuit means for activating selected ones of the gate means according to the characteristic detected by said second detecting means.

2. The machine of claim **1** wherein the first detecting means comprise:

photoelectric means for determining the width of said veneer sheets.

3. The machine of claim **2** wherein said infeed means includes an endless belt tipple which moves to a non-infeeding position when said photoelectric means detects veneer sheets of less than a minimum width and which moves to an elevated feeding position when said photoelectric means detects veneer sheets that are at least said minimum width.

4. The machine of claim **3** wherein said infeed means further includes

a second conveying belt to receive sheets from said tipple when the same is in said elevated feeding position and to carry them to a point of engagement by said overhead conveying belt, and

means for aligning the selected sheets as they enter said machine.

5. A machine for sorting and stacking wood veneer sheets having variable quality characteristics comprising:

infeed means for feeding veneer sheets having a selected size into said machine;

means for conveying said selected veneer sheets through said machine;

a plurality of stacking stations each having a pair of bins for alternately receiving said selected veneer sheets;

a plurality of gate means, each operable between a first position and a second position, said gate means being located along said conveying means at

each of said stacking stations for diverting, when in said second position, said selected veneer sheets from said conveying means into a selected one of said pair of bins; and

electric circuit means for selecting a station according to the quality characteristic of each sheet and for operating said gate means between said first and second positions.

6. The machine of claim **5** wherein said conveying means comprises:

an overhead endless belt for frictionally engaging the top sides of said veneer sheets, and

a pair of low friction faced rails on which said veneer sheets ride as they are pulled by said overhead belt.

7. The machine of claim **5** wherein said infeed means comprise aligning means for correctly positioning said selected veneer sheets prior to their being engaged by said overhead belt.

8. The machine of claim **7** wherein said aligning means comprises a pair of endless belts located on each side said machine, said belts each having a vertical axis of rotation.

9. The machine of claim **5** wherein said gate means are disposed along said conveying means, one of said gate means being disposed above each of said bins.

10. The machine of claim **9** wherein said first position of said gate means is horizontal whereby said veneer sheets conveyed by said conveying means pass over said gate means without being affected thereby, and said second position is elevated whereby veneer sheets will be diverted downward beneath said gate means into the stacking bin therebelow.

11. The machine of claim **9** further including drop arms rotatable between a retaining and a releasing position, said drop arms being positioned above each bin beneath said gate means, said drop arms being disposed in pairs and being adapted to receive a veneer sheet diverted by said gate means when in said retaining position, said sheet remaining upon said pairs until it is substantially at rest, and means positioned at the downstream end of said drop arms and adapted to contact the leading end of said sheet to rotate said drop arms to said releasing position only when said sheet is resting completely on said drop arms, whereby said sheet passes vertically downwardly into said bin without horizontal velocity.

12. The machine of claim **5** wherein each of said stacking stations includes a stacking hoist having two pairs of hoist arms vertically movable with respect to said hoist, each of said pairs of said hoist arms being disposed in a respective one of said bins.

13. The machine of claim **12** wherein said stacking hoists further include chain means for movably connecting said hoist arm pairs so that when one pair is lowered the other pair is raised.

14. The machine of claim **13** wherein said hoist arm pairs are gravity operated by the weight of the veneer sheets thereon and each of said stacking hoists further includes an air brake for selectively preventing movement of said hoist arm pairs.

15. The machine of claim **14** wherein each of said hoists includes circuit means for releasing said air brakes when the stack of veneer sheets on a pair of hoist arms reaches a selected level, and for reapplying said brakes when said pairs of hoist arms have dropped a selected distance.

16. The machine of claim **5** wherein said electric circuit means comprises:

a detecting means for determining a quality characteristic of a sheet;

a plurality of switch means disposed at predetermined locations along said conveying means for detecting the location of a sheet as it moves along said conveying means; and

relay means responsive to said switch means for electrically operating said gate means according to the detected quality characteristic only as said sheet reaches said predetermined locations in said machine.

17. The machine of claim **16** wherein said circuit means further includes:

second switch means for detecting the presence of a full stack of veneer sheets in each bin of a stacking station, and

latch means responsive to said additional switch means for causing said relay means to close said gate means corresponding to a bin having said full stack of veneer sheets and to open said gate means of the other bin of said pair.

18. The machine of claim **17** further including means responsive to said second switch means for removing said full stack of sheets from said bin having said full stack of veneer sheets.

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