Sept. 30, 1958 R. C. RYDBERG ET AL 2,854,153

AUTOMATIC VENEER LAYING MACHINE

Filed June 6, 1956 3 Sheets-Sheet 1

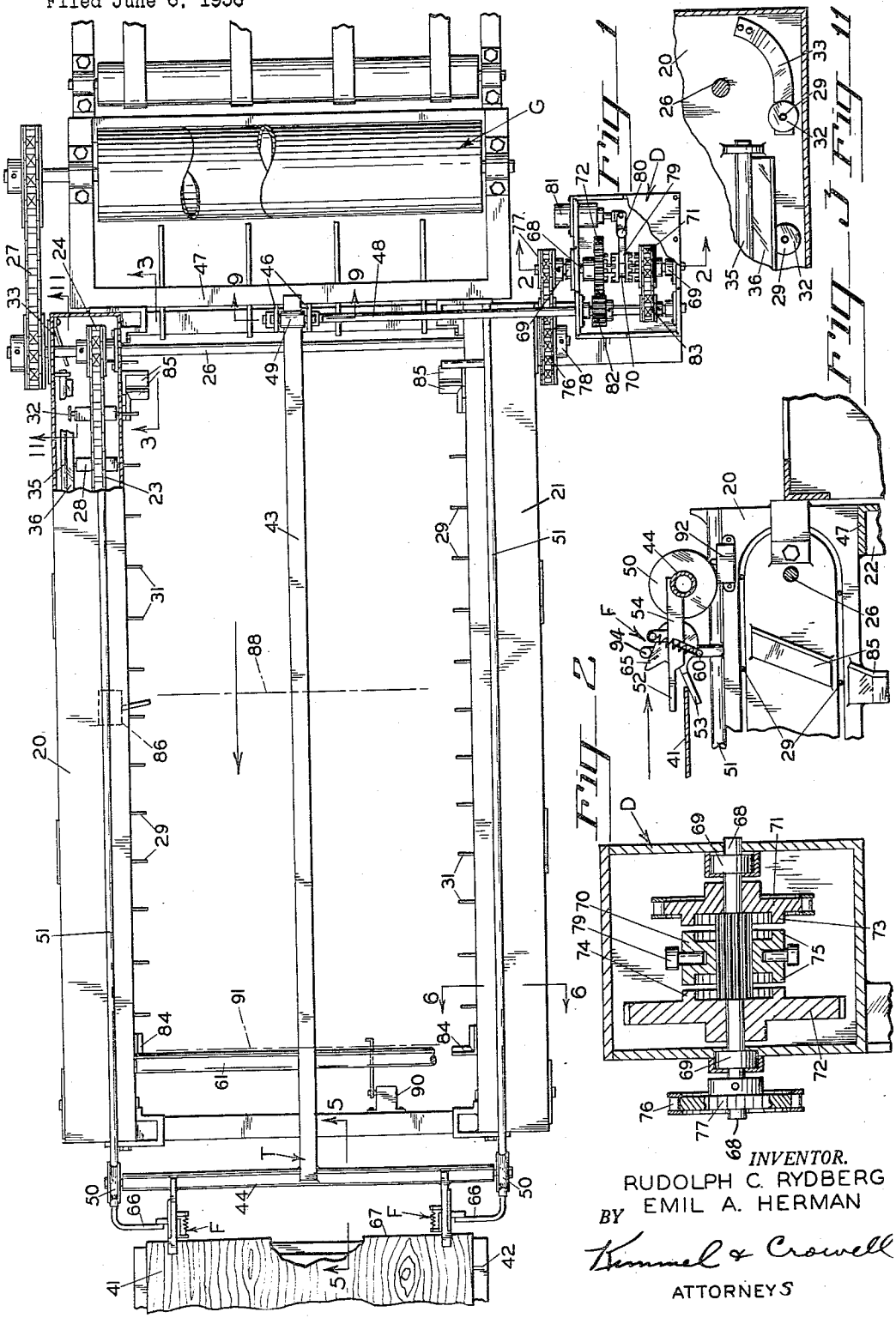

Fig. 1

Fig. 2

Fig. 3

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AUTOMATIC VENEER LAYING MACHINE

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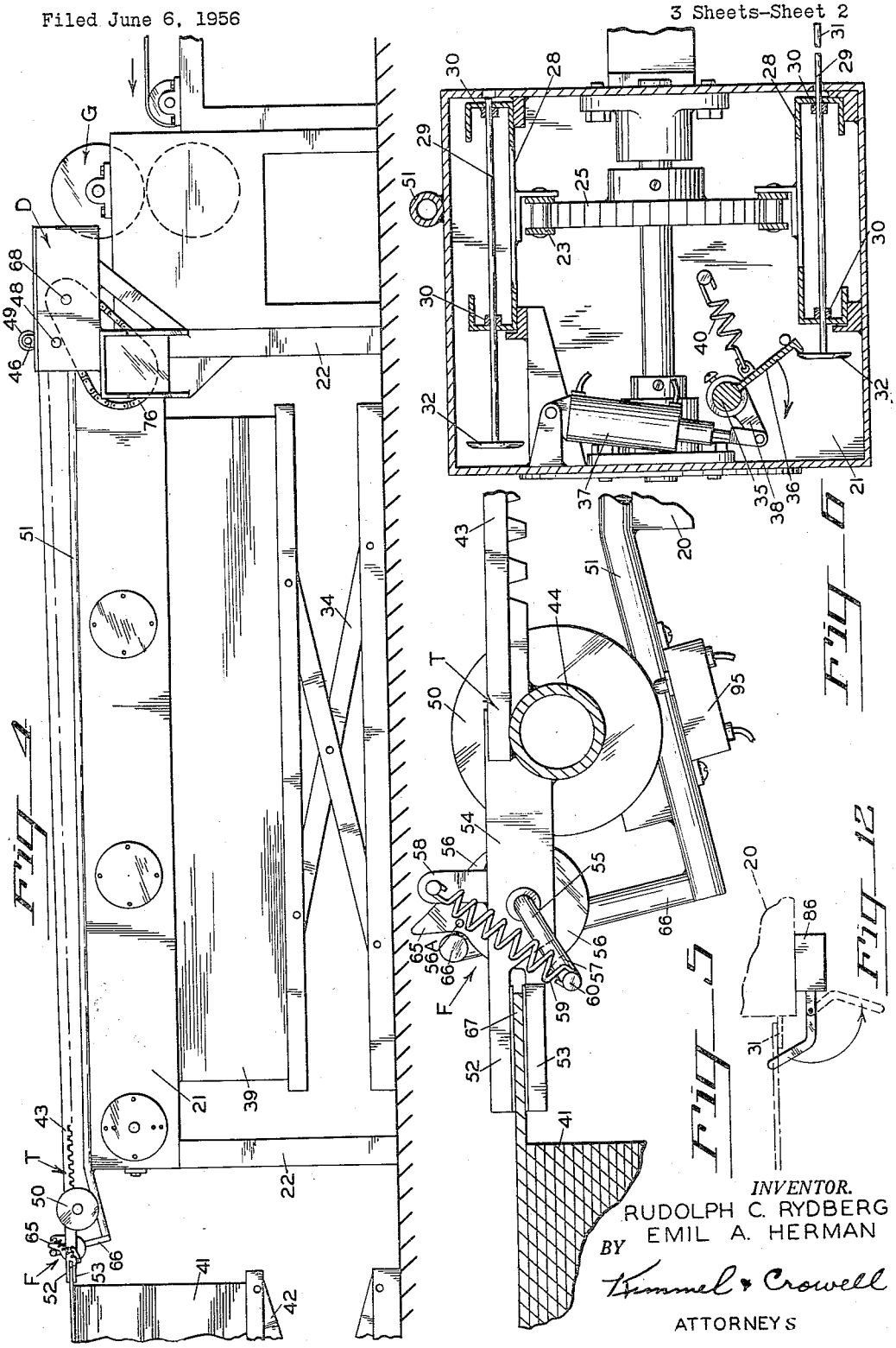

Fig. 4

Fig. 5

Fig. 6

Fig. 12

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Filed June 6. 1956 3 Sheets-Sheet 3

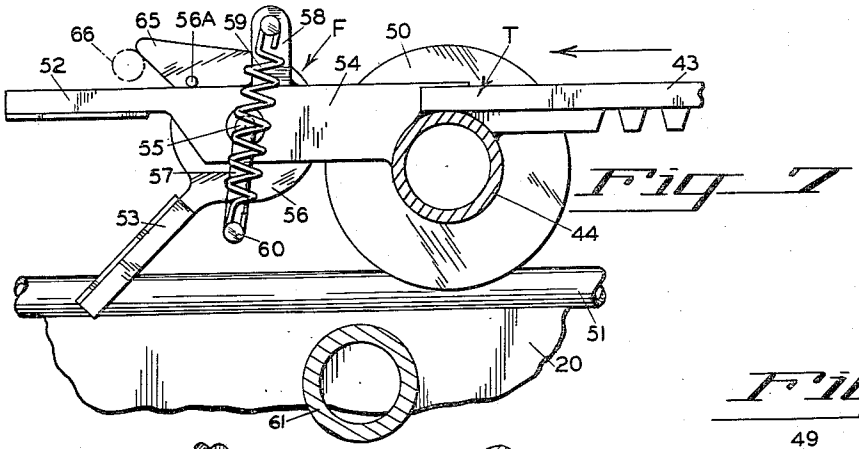

Fig 7

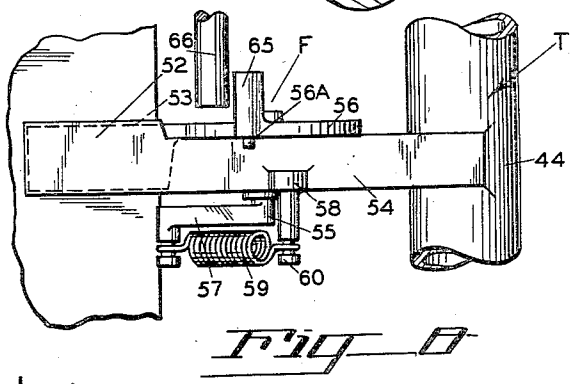

Fig 8

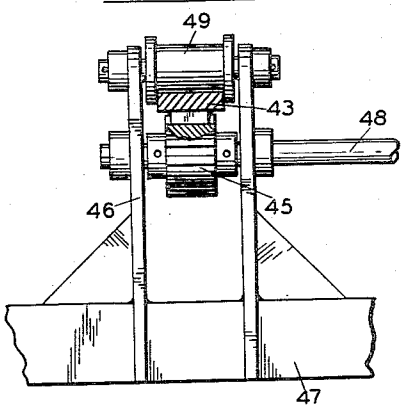

Fig 9

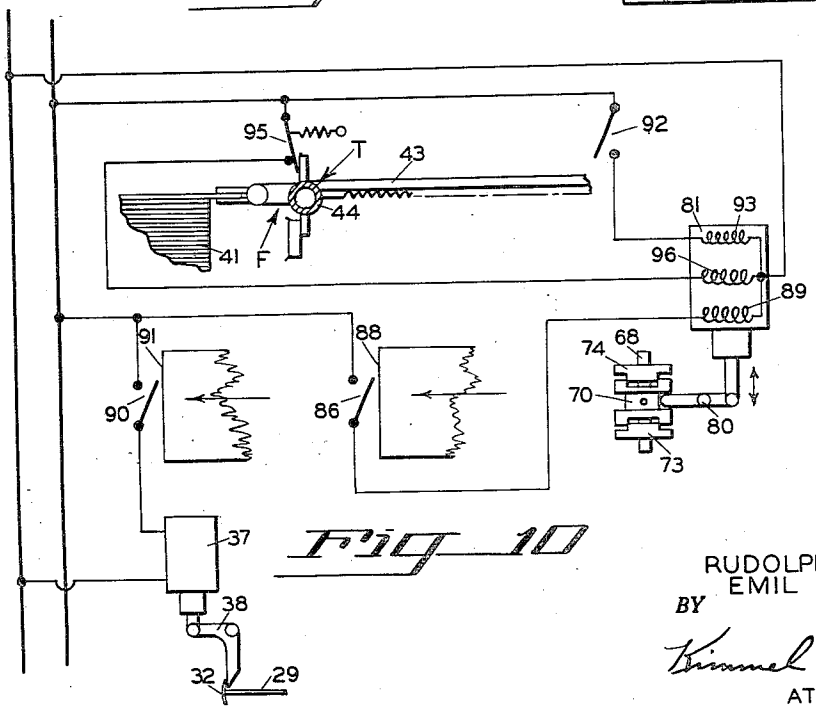

Fig 10

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2,854,153

Patented Sept. 30, 1958

2,854,153

AUTOMATIC VENEER LAYING MACHINE

Rudolph C. Rydberg and Emil A. Herman, Westfir, Oreg.

Application June 6, 1956, Serial No. 589,654

5 Claims. (Cl. 214—6)

The present invention relates to an automatic veneer laying machine for laminating veneer in the manufacturing of plywood.

The primary object of the invention is to provide a machine that will lay the core and face sheets, one on top of the other, in the proper sequence for fabricating various thicknesses of plywood board.

Heretofore laying and assembling of core and face veneer sheets in the manufacturing or fabricating of plywood has all been done by a hand process, which has proved very slow in the production of plywoood.

A further object of this invention is to provide a machine that will fabricate plywood with greater precision and less waste.

This new and improved veneer laying machine is used in conjunction with equipment constructed in accordance with our now pending application on Veneer Joining Edge Staplers, Serial No. 575,821, filed April 3, 1956. In our new and improved veneer joining edge stapler a uniform sheet of core veneer approximately 4' x 8' in dimensions is delivered into the glue applicator, from where it is delivered onto the veneer laying machine comprising the instant invention. The core veneer sheets are delivered from the glue machine into our new and improved veneer laying machine.

Other objects and advantages will become apparent in the following specification when considered in the light of the attached drawings, in which:

Figure 1 is a plan view of our new automatic veneer laying machine shown located at the delivery end of a standard glue machine.

Figure 2 is an enlarged fragmentary sectional view of a selective gear box assembly with this machine, taken on the line 2—2 of Figure 1, looking in the direction of the arrows.

Figure 3 is a detail view, taken on the line 3—3 of Figure 1, looking in the direction of the arrows.

Figure 4 is a side elevation of the machine.

Figure 5 is an enlarged detail sectional view, taken on the line 5—5 of Figure 1, looking in the direction of the arrows.

Figure 6 is a transverse sectional view of one of the veneer carrying units, taken on the line 6—6 of Figure 1, looking in the direction of the arrows.

Figure 7 is a fragmentary enlarged detail side sectional view of the fingers for gripping the veneer sheets to be stacked.

Figure 8 is a fragmentary plan view of Figure 7.

Figure 9 is a fragmentary sectional view, taken on the line 9—9 of Figure 1, looking in the direction of the arrows.

Figure 10 is a diagrammatical layout of some of the elements of the machine, including the wiring diagram of the controls for operating the machine.

Figure 11 is an enlarged fragmentary longitudinal cross-section taken on the line 11—11 of Figure 1, looking in the direction of the arrows.

Figure 12 is a side view of the T bar actuating switch.

Referring now to the drawings in detail wherein like reference numerals indicate like parts throughout the several figures, the reference numerals 20 and 21 indicate a pair of parallelly spaced square shaped tubular units for carrying veneer sheets from one end of the machine to the other, and are mounted upon leg supports 22. Endless chains 23 run throughout the length of the units 20 and 21 and are trained about driving sprockets 24 at their one end and over idler sprockets 25 at their opposite ends. The driving sprockets 24 are keyed to a cross shaft 26, which is journalled within the units 20 and 21 and is driven from the glue machine G by any suitable means, such as a chain 27. The chains 23 have special transverse brackets 28 formed thereon and are adapted to have fingers 29 slidably mounted thereon within bearings 30.

The fingers 29 extend inwardly towards the center of the machine at 31 and have heads 32 formed on their opposite ends, referring particularly to Figure 6. The fingers 29 are pushed towards the inner part of the machine to the position shown particularly in Figures 1 and 6 by cams 33. After the lower run of the chain 23 leaves the sprockets 24 it is moved away from the glue machine G, the forward edge of the veneer has entered in alignment with the lower run of the chain 23 and is being carried therealong by the fingers 29 to the left end of the machine as will be more fully described later.

The veneer being carried by the fingers 29 from the glue machine G includes only the core veneer stock after the glue has been applied thereto.

Referring to Figure 4, located under the units 20 and 21 is a scissor type platform hoist 34 adapted to receive both the core and face veneer stock when delivered thereon. The core veneer is released from the fingers 29 at a predetermined time to be dropped on the platform hoist 34. This is accomplished by withdrawing the fingers 29 from under the core veneer completely along the under run of the chains 23.

Referring to Figure 6, shafts 35 run longitudinally of the units 20 and 21 and are journalled therein by suitable bearings. Affixed to this shaft is an elongated lever 36. Located at one end of the shaft 35 is an electric solenoid 37 whose core is pivotally connected to the lever 38 forming part of the shaft 35. When the solenoid 37 is energized it will rotate the elongated lever 36 in the direction of the arrow, pulling against the heads 32 of the rods 29, pulling the rods 29 into the position shown on the upper run of the chain 23, dropping the sheet of veneer onto the platform 34 on a stack 39 of material. The lever 36 is returned to its starting position by the action of a spring 40.

Referring to Figures 1, 4 and 5, face veneer sheets 41 are stock piled upon a platform scissor hoist 42, which is adapted to be raised by self contained means provided within this type of hoist for raising the stock pile as the same is being used. The face veneer 41 is removed from the stock pile by one or more sheets at a time and transferred across the upper side of the units 20 and 21 by the mechanism to be described.

Referring to Figures 1, 4, 5 and 9, a T bar assembly T consisting of an elongated inverted rack 43 having a T or cross head member 44 formed on one of its ends is adapted to move back and forth in regards to the machine. The oppositely disposed end of the rack 43 is adapted to be supported upon a pinion 45 journalled within a bracket 46 of the framework 47 of the machine.

The pinion 45 is keyed to a shaft 48 and is adapted to be rotated in either direction by the shaft 48. A hold down roller 49 is adapted to hold the rack 43 in contact with the pinion 45. The cross member 44 of the T

assembly T is adapted to be supported by trunnion wheels **50** on tracks **51**, which are mounted to the upper surfaces of the units **20** and **21**. Extending beyond and forming part thereof are finger assemblies F.

The finger assemblies F consist of fingers **52** and **53**. The fingers **52** form part of the arms **54** which are fixedly mounted to the transverse members **44**. The fingers **53** are pivotally mounted to the arms **54** and **55** by disk type hubs **56**. The hubs **56** are fixedly secured to a crank shaft **57**, the shaft **57** forming a pivot for the finger assembly F.

Extending upwardly from the arms **54** are brackets **58**. The brackets **58** are adapted to support one of the ends of the spring **59**, as best illustrated in Figures 5 and 7. The opposite end of the spring **59** is adapted to be pivotally connected to the pin **60** of the crank shaft **57**. This is an over-center type of arrangement. When in the position shown in Figure 5, the fingers **53** will be held in contact with the fingers **52**, and while in the position shown in Figure 7, the fingers **53** will be held out of engagement with the fingers **52**. A stop **56A** is carried by the hub **56** in position to engage the arm **54** to limit the downward movement of the finger **53**.

The T bar assembly T is shown in our drawings in the position in Figures 1, 4, 5 and 8, all gripping a sheet of face veneer **41** by the finger assemblies F. In Figure 7 the fingers F are shown in released or open position travelling in the direction of the arrow.

A cross member **61** bridges the space between the units **20** and **21** and is adapted for supporting the face sheet of plywood **41** while being brought into stacking position.

A pawl **65** is formed integral with the disk hub **56** of the fingers **53** and as the finger assembly F moves in the direction of the arrow, the pawl **65** will strike the stop **66** which will move the fingers **53** towards the fingers **52** and gripping the end **67** of the face veneer **41**, the spring **59** pulling the crank pin **60** over its center line, and to the opposite side of this center line, as shown in Figure 5, causing the fingers **52** and **53** to grip the end **67** of the veneer **41** tightly.

We will now describe the mechanism for operating the T bar assembly T. The shaft **48** is driven in the desired direction from the drive gear assembly D, referring to Figures 1 and 2. A counter shaft **68** is journalled within suitable bearings **69** within the gear box D. Splined to the counter shaft **68** is a slidable double clutch member **70**. Rotatably mounted on the shaft **68** is a sprocket **71** and a spur gear **72**. Teeth **73** are formed on the sprocket **71** and teeth **74** are formed on the gear **72** and are adapted to be selectively engaged with the jaws **75** of the clutch element **70**.

The counter shaft **68** is driven from the shaft **26** of the machine by a chain drive **76** through a driven sprocket **77** and a driving sprocket **78**.

The element **75** is moved into engagement with either the sprocket **71** or the gear **72** by a yoke **79**, which is pivotally mounted to the case of the gear box D at **80**, and is operated by the electric solenoid **81** in either direction. The shaft **48** and its associated pinion gear **45** is rotated in one direction from the counter shaft **48** by the spur gear **72** and a spur gear **82** when the jaws **75** of the clutch element **70** are engaged within the teeth **74** of the gear **72**. The rack **43** is moved longitudinally of the machine by the pinion **45** associated with the shaft **48**, which is driven in one direction.

The shaft **48** is driven in the opposite direction by the counter shaft **68** by the jaws **75** of the clutch element **70** engaging the teeth **73** of the sprocket **71**. This in turn drives the sprocket **83**, which will drive the shaft **48** in the opposite direction to that driven by the gear **72**. Referring to Figure 1, vertical guide stops **84** and **85** position the veneer of the stack **39** when being discharged from the machine.

Referring to Figures 1 and 10, a microswitch **86** is mounted part way between the ends of the elements **20** and **21** to one of the elements **20** and **21** and is adapted to be actuated by the forward edge **88** of the core veneer moving towards the switch **86**. The switch **86** controls electric energy into the clutch solenoid **81** through the winding **89**.

A switch **90** is fixedly secured to the machine and is adapted to be contacted by the forward edge **91** of the core veneer at the end of its travel previous to being released onto the pile of veneer **39** from the fingers **29**. The switch **90** energizes the solenoid **37** which releases the fingers **29** from under the core veneer **39**, as above described.

A switch **92** is fixedly secured to the frame of the machine at its opposite end, and is adapted to stop the travel of the T bar assembly T after it releases the face veneer **41** to be dropped on the pile of stock **39**, at the same time that the core veneer has been released by the fingers **29**. The switch **92** energizes the coil **93** of the clutch solenoid **81** reversing the direction of rotation of the pinion **45** and the shaft **48** moves the rack **43** to its starting position, as indicated in Figures 1, 4 and 5, by the above described clutch operating mechanism.

We will now describe how this new and improved veneer laying machine operates. The veneer cores enter at the right hand of the machine from the glue machine G. The fingers **29** are extended beyond the inner sides of the units **20** and **21** on the lower run of the chain **23** by the action of the cams **33** contacting the heads **32** of the fingers **29** pushing them forward. The core sheet of veneer is then supported on top of the fingers **29** as they travel in the direction of the arrow to the left of the machine.

On reaching the broken line point **88**, referring to Figures 1 and 10, the forward end **88** of the veneer closes the switch **86**. This will energize the winding **89** of the operating solenoid **81**, referring to Figures 1, 2 and 10 engaging the jaws **75** of the double clutch **70** into the teeth **73** of the gear **72**. This will revolve the shaft **48** in one direction, namely to pull the T bar assembly T to the right in the opposite direction of the arrow. This will cause the finger assembly F to pull the sheet or sheets of face stock from the pile **41** over the top of the cross supporting member **61** of the machine until the forward edge **91** of the face veneer reaches a point above the guides **85**.

Referring to Figure 3, when the above happens the pawl **65** of the finger **53** will strike the stop **94**, which will open the fingers F and permit the veneer to drop down into the guides **85** and into the guides **84** on the opposite end of the machine. At the same time this happens, the forward edge **91** of the core sheet of veneer, referring to Figures 1 and 10, will close the switch **90** which will withdraw the fingers **29** from under the veneer core sheet allowing the same to drop down onto the pile **39** of veneer, including the face veneer above described being drawn across the machine by the fingers F.

When the fingers F were opened by the stop **94**, the switch **92** was closed by the wheel **50**, referring to Figures 3 and 10. This energized the coil **93** of the solenoid **81** which disengages the clutch element **70** from the gear **72** and engages the same with the sprocket **71**. This will reverse the direction of travel of the T assembly T, moving the same in the direction of the arrow to its loading position. When the finger assembly F of the T element reaches the end of its travel, as shown in Figure 5, one of the trunnion wheels **50** will close the switch **95** which will energize the coil **96** of the solenoid **81** neutralizing the clutch **70** stopping the rotation of the shaft **48** until the next cycle of operation.

As stated above, when the T assembly T reaches the starting point as illustrated in Figure 5, the stop **66** on the frame of the machine will engage the pawl **65** closing the fingers **53** against the underside of the end **67** of the face veneer gripping the end **67** between the fingers **52** and **53**.

Having thus described the preferred embodiment of the invention, it should be understood that numerous structural modifications and adaptations may be resorted to without departing from the scope of the appended claims.

What is claimed is:

1. An automatic veneer laying machine comprising a frame, an adjustable stack support positioned in said frame, means mounted on said frame for gripping and conveying a sheet of face veneer across said frame to a position overlying said stack support, means on said frame for conveying a core veneer across said frame to a position overlying said stack support and in aligned relation with said face veneer, means on said frame actuated by movement of said veneer for controlling the movement of said conveying means, and means on said frame for delivering said core veneer and said face veneer to said stack support simultaneously.

2. A device as claimed in claim 1 wherein said face veneers are positioned at one end of said machine and said core veneers are positioned at the other end of said machine with said conveying means moving said face veneer and said core veneer oppositely into position for delivery onto said stack support.

3. A device as claimed in claim 1 wherein said gripping and conveying means includes a pair of pivoted jaws, and resilient means adapted when in one position to hold said jaws open and in the opposite position to hold said jaws closed.

4. A device as claimed in claim 3 wherein said jaws are carried by a pinion driven rack bar.

5. A device as claimed in claim 3 wherein means are provided on said frame for moving said means for holding said jaws open and closed to the first position, and a second means on said frame for moving said jaw holding means to said opposite position.

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