Dec. 4, 1956 R. N. WARE, JR 2,772,717

METHOD AND APPARATUS FOR MAKING PAPER COVERED WOOD VENEER ASSEMBLIES

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Fig. 1

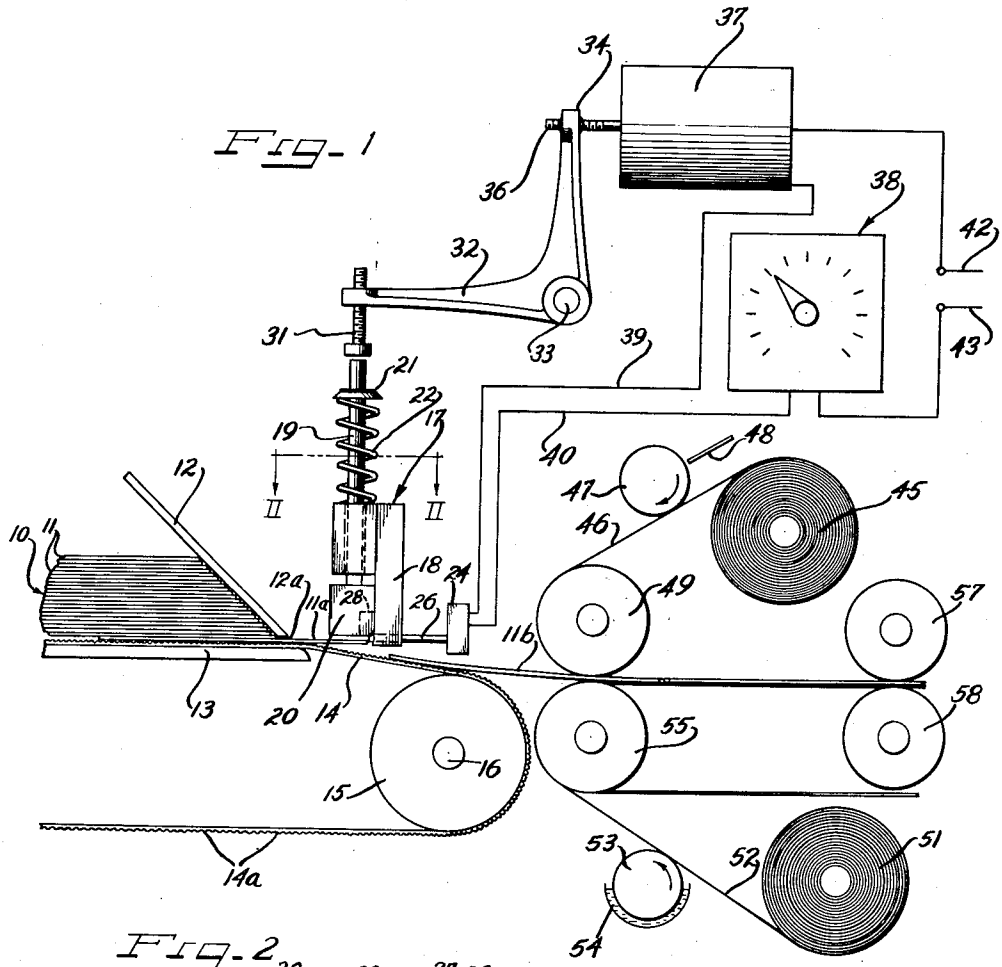


Fig. 2

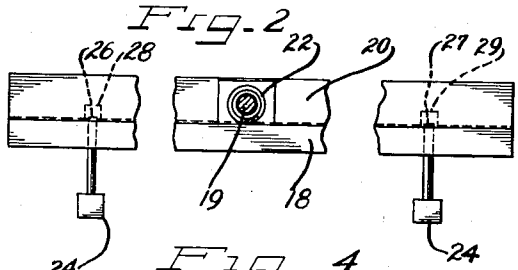


Fig. 3

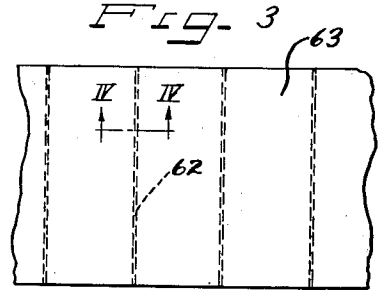
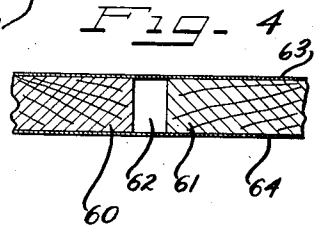


Fig. 4



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METHOD AND APPARATUS FOR MAKING PAPER COVERED WOOD VENEER ASSEMBLIES

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9 Claims. (Cl. 154—1.6)

This invention is directed to a method of and means for feeding wood veneer panels from a stack of such panels and in a specific embodiment of the invention, provides means for feeding panels individually into a paper coating machine in which the panels in spaced relation are coated on both sides with continuous webs of strong paper.

The present invention has particular applicability to the manufacture of paper covered wood veneer assemblies having separated wood veneer panels joined by paper covers to produce blanks for wrapping around end pieces and forming bottoms, sides and top lids of a carton or box.

The method and apparatus of the present invention provide a positively acting, controllable means for feeding wood veneer panels one at a time in spaced relation to an apparatus in which individual, spaced panels are covered on both sides with continuous webs of paper forming the outer and inner surfaces of the box. Means are also provided in the feeding mechanism to adjust the spacing between the panels as they are fed into the paper coating mechanism.

In a preferred form of the present invention, the veneer panels are stacked, and then fed individually from the stack by means of a conveyor mechanism which engages one of the panels on the stack. The conveyor mechanism is effective to move the single panel from the stack against an abutment means which is arranged to engage the selected panel and to restrain it from further linear movement. An impact means is arranged to disengage the panel from the abutment means after a predetermined time interval, so that the conveyor means again transports the single panel to a station where it is picked up by a paper coating mechanism. In the latter mechanism, the individual panels being fed thereto are coated on both sides with continuous webs of strong paper to produce a structure which consists of two outside faces of paper reinforced by spaced wood veneer panels, the gaps between the panels being sufficient to provide hinges for forming the reinforced assemblies into cartons or other types of enclosures.

A primary object of the present invention is to provide a method for feeding individual veneer panels in a controlled manner from a stack of such panels.

Another object of the invention is to provide a method for feeding wood veneer panels into a paper coating mechanism, and regulating the flow of such panels according to a predetermined timed sequence.

Still another object of the invention is to provide an improved apparatus for delivering individual panels from a stack of panels in timed relation to each other.

A further object of the invention is to provide an automatically operating wood veneer feeding mechanism which can be controlled so as to vary the spacing of individual panels.

Other and further objects and features of the present invention will be apparent to those skilled in the art from the following description of the specific embodiment of the invention illustrated in the drawings.

In the drawings:

Figure 1 illustrates in a schematic manner the apparatus employed in feeding the veneer panels into the paper coating assembly;

Figure 2 is a fragmentary cross sectional view taken substantially along the line II—II of Figure 1;

Figure 3 is a fragmentary plan view of a paper coated veneer panel at the completion of the process; and

Figure 4 is an enlarged cross sectional view taken substantially along the line IV—IV of Figure 3.

As shown on the drawings:

In Figure 1, reference numeral **10** indicates generally a stack of individual wood veneer panels **11** enclosed within a suitable bin which includes an angularly disposed baffle **12** and a stationary supporting surface **13** underlying the stack **10**. The inclined baffle **12** is spaced from the stationary supporting surface **13**, leaving a space **12***a* sufficiently wide to accommodate a single panel **11** and a single thickness of an endless conveyor belt **14**. The belt **14** is preferably composed of rubber or similar material and has on its surface corrugations **14***a* or other suitable means to provide a good gripping surface by means of which the conveyor belt **14** can achieve good frictional engagement with the lowermost panel **11***a* of the stack **10**. The conveyor belt **14** is driven by engagement with a roller **15** on a driven shaft **16**.

As the conveyor belt **14** moves to the right as viewed in Figure 1, the frictional engagement between the belt **14** and the lowermost panel **11***a* is sufficient to slide the panel **11***a* away from the remainder of the stack **10** and through the opening **12***a*. As the panel **11***a* moves outwardly through the opening **12***a*, it engages an abutment means indicated generally at numeral **17** in the drawings.

The abutment means **17** may includes a block **18** which slidably receives a shaft **19** and a plunger mechanism **20**. A collar **21** is provided on the shaft **19**, and a coiled helical spring **22** is disposed between the collar **21** and the top of the block **18** to normally urge the plunger member **20** upwardly out of engagement with the lowermost panel **11***a* as it comes into contact with the abutment means.

Also associated with the abutment means **17** are a pair of quick acting switches such as microswitches **24** which, in their normal unenergized condition have operating plungers **26** and **27**, respectively, arranged to engage the end of the lowermost panel **11***a*. The switches **24** are arranged in parallel circuit relationship so that contact with one of the switches by the panel **11***a* is sufficient to energize the circuit in which the switches are located. As seen in Figures 1 and 2, the plunger member **20** is relieved as indicated at **28** and **29** to accommodate the ends of the operating plungers **26** and **27** so that upon downward movement of the plunger member **20**, the plunger member **20** will impact the panel **11***a* without striking the switches.

The movement of the plunger member **20** is effected by the engagement of the rod **19** with a threaded bolt **31** secured to one end of a rocker arm **32**. The rocker arm **32** is pivoted on a shaft **33** and at its opposite end is provided with a swivel connection **34** which receives the threaded end of a plunger **36**. The plunger **36** in turn is actuated by means of a solenoid **37** such that upon energization of the solenoid, the plunger **36** causes the rocker arm **32** to pivot about the shaft **33** and thereby causes the threaded bolt **31** to strike the end of the rod **19**. The resulting impact of the plunger **20** is sufficiently strong to bend the panel **11***a* and release the end of the panel from engagement with the abutment means **17**.

It is desirable to provide a means in the apparatus described to permit variation of the spacing between individual panels as they are fed from the stack **10**.. For this purpose, the assembly includes a time delay mech-

anism indicated generally by numeral 38 in the drawings, the mechanism comprising a time delay relay, a dashpot, or other commonly used mechanism for delaying completion of an electrical circuit for a variable interval after an initial actuation of the switch mechanism. The time delay mechanism 38 is in series with the microswitches 24 and the solenoid 37. A lead 39 connects one side of the switches 24 (both of which are connected in parallel) to one end of the solenoid coil, and another lead 40 connects the other side of the switches 24 to the time delay mechanism 38. A source of electrical potential, indicated by the leads 42 and 43, is connected across one end of the solenoid coil 37 and the opposite side of the time delay mechanism 38 as indicated.

The time delay mechanism 38 is adjusted to provide a suitable time interval between the initial engagement of the panel 11*a* with the switches 24 and the operation of the plunger mechanism 20 to disengage the panels from contact with the switches. The length of the time interval, in turn, determines the amount of spacing between individual panels as they are being fed to the paper coating mechanism.

Once the panel 11*a* has been disengaged from the abutment 17 by the operation of the plunger means 20, the conveyor belt 14 again carries the panel to a paper coating mechanism where a continuous web of paper is applied to both sides of the spaced panels being delivered from the feeding mechanism. For this purpose, there is provided a supply reel 45 from which a paper web 46 is continuously unwound, the web 46 preferably consisting of a strong paper such as unbleached kraft or the like. A glue applicator roll 47 distributes a film of adhesive onto the web 46 from a fountain 48, and the adhesive covered sheet then passes over the periphery of a pressure roller 49.

Similarly, for the bottom surface of the veneer panel, there is provided a supply reel 51 which feeds a web of paper 52 to a glue applicator station which a roller 53 partially immersed in a supply of glue 54 applies a thin film of the glue to the surface of the web 52. The paper with the adhesive applied to it then passes over a pressure roll 55 which cooperates with the pressure roll 49 in defining a nip which receives a panel 11*b* from the feeding mechanism.

A soya bean glue capable of cold setting on wet wood is preferred as an adhesive.

The condition of the panel as received in the paper coating mechanism may be either wet or dry, but I prefer to employ undried green veneer panels having about 30% or more moisture. With this moisture content, the panels are swollen but are still readily capable of bonding to the adhesive surfaced webs 46 and 52.

After application of the two paper webs to the panel, the paper covered veneer panels are passed continuously into the nip existing between a second pair of pressure rollers 57 and 58 where the paper sheets are more securely bonded to the veneer panels. A non slipping bond between the wood and paper is created. Where a relatively moist panel has been employed, it is desirable to then pass the paper coated veneer into an oven where heat and pressure are applied in sufficient quantities to dry out the wood veneer to a normal moisture content and to complete the setting of the adhesive on the paper webs. The composition leaving the oven is a reasonably dry series of spaced wood veneer panels retained in their original swollen dimensions by the continuous paper webs.

The finished product is illustrated in Figures 3 and 4 of the drawings. This product includes a series of spaced wood veneer panels 60 and 61 each separated by a gap 62, with a pair of continuous paper sheets 63 and 64 forming the outer and inner surfaces of the laminated box blanks. The continuous sheet assembly is transversely cut to form box blanks each composed of panels for forming the bottom, sides and top lids of a box.

From the foregoing, it will be appreciated that the present invention provides an automatic process for feeding individual veneer panels from a stack of such panels into a paper coating machine or other veneer handling equipment. The apparatus described is readily capable of being adjusted to vary the spacing between the panels to produce paper covered wood veneer products having the wood veneer panels in any predetermined spaced relationship.

It will be evident that various modifications can be made to the described embodiment without departing from the scope of the present invention.

I claim as my invention:

1. A method for feeding wood veneer panels in time sequence which comprises stacking a plurality of wood veneer panels into a pile, feeding individual panels from said pile onto a moving supporting surface, bringing the panel on said supporting surface into contact with an abutment so as to stop the movement of said panel along said moving supporting surface, maintaining said panel against said abutment until a predetermined relative movement occurs between said panel and said moving supporting surface, then subjecting said panel to an impact sufficient to free said panel from said abutment, and thereafter carrying said panel along said moving supporting surface.

2. The method of making box blanks which comprises successively urging panels or the like against a stop, freeing the panels from the stop in sequential timed relation to control the spacing between the panels, advancing the freed panels in uniformly spaced relation between sheets of paper, and gluing the spaced panels to the paper.

3. The method of making paper covered wood veneer box blanks which comprises forming a stack of wood panels, continuously advancing a conveyor under the stack to advance the bottom panel in the stack against a stop, holding said panel against said stop for a predetermined time interval, releasing the panel from said stop after said time interval has elapsed, again moving the freed panel on the conveyor to advance the panel away from said stack, depositing the freed panel in the stack on the conveyor, repeating the advancing, holding, releasing and moving steps to form a series of equally spaced panels, and gluing paper covers on said series of panels.

4. An apparatus for feeding veneer panels in time sequence which comprises means for supporting a stack of veneer panels, conveyor means arranged to transport a single panel from said stack, an abutment means arranged to be engaged by said single panel during its movement, a switch in said abutment arranged to be energized by said panel when said panel engages said abutment means, an electrically operated plunger means arranged to impact against said panel, and a time delay mechanism between said switch and said plunger means arranged to delay said impact until a predetermined interval after said panel engages said switch.

5. An apparatus for feeding veneer panels in timed relation which comprises means for supporting a stack of veneer panels, an endless conveyor belt arranged to engage one of said panels on said stack and to move said panel away from said stack, an abutment means arranged to engage said one panel during its movement on said belt, a switch associated with said abutment means and arranged to be engaged by said one panel, an electrically operated plunger means energized by the closing of said switch to impact against said one panel, and a time delay mechanism in series with said switch and said plunger means arranged to delay said impact until a predetermined interval after said panel closes said switch.

6. An apparatus for feeding veneer panels in timed relation which comprises means for supporting a stack of veneer panels, an endless conveyor belt arranged to engage one of said panels on said stack and to move said

panel away from said stack, an abutment means arranged to engage said one panel as said one panel moves away from said stack, a switch associated with said abutment means arranged to be closed by contact with said one panel, a solenoid in series with said switch, an impact member operated by said solenoid and arranged to disengage said one panel from said abutment means, and a time delay mechanism in series with said switch and said solenoid arranged to delay the operation of said impact member until a predetermined interval after said panel closes said switch.

7. Apparatus for forming paper covered veneer panels which comprises means for supporting a stack of veneer panels, a conveyor means arranged to transport a single panel from said stack, an abutment means arranged to be engaged by said single panel during its movement, a switch in said abutment means arranged to be engaged by said panel when said panel engages said abutment means, an electrically operated impact means arranged to impact against said panel when said panel engages said abutment means, a time delay mechanism in series with said switch, said mechanism being arranged to delay the operation of said impact means for a predetermined interval after said panel engages said switch, and paper applicator means arranged to receive said panel from said conveyor means and apply a sheet of paper on each side of said panel.

8. An apparatus for forming paper covered veneer panels which comprises means for supporting a stack of veneer panels, an endless conveyor belt arranged to engage one of said panels on said stack and to move said

panel away from said stack, an abutment means arranged to engage said one panel during its movement on said belt, a switch associated with said abutment means and arranged to be engaged by said one panel, an electrically operated plunger means energized by the closing of said switch to impact against said one panel, a time delay mechanism in series with said switch and said plunger means arranged to delay said impact until a predetermined interval after said panel closes said switch, and paper applicator means arranged to receive said panel from said conveyor means and apply a sheet of paper on each side of said panel.

9. A machine for producing box blanks which comprises a bin for a stack of veneer panels, means at the bottom of the bin for advancing the bottommost panel out of the bin, a stop in the path of the advancing panel, means for disengaging the stop and panel, and a time delay mechanism actuated by the panel for controlling the panel holding time.

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