Sept. 4, 1956 R. N. WARE, JR 2,761,487

METHOD AND APPARATUS FOR MAKING WEB COVERED SPACED PANELS

Filed Sept. 21, 1954 2 Sheets-Sheet 1

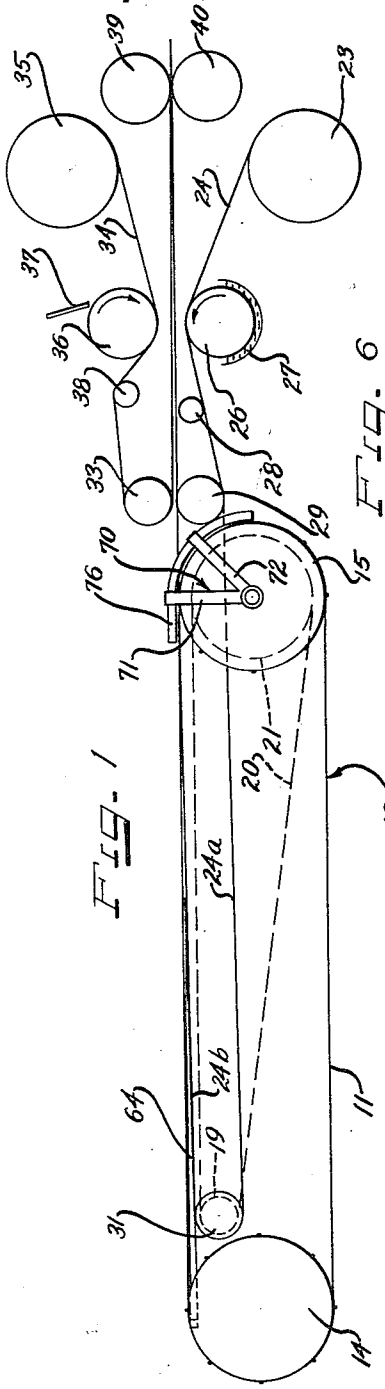


FIG. 1

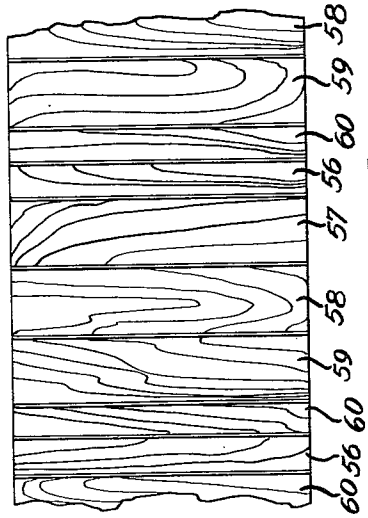


FIG. 6

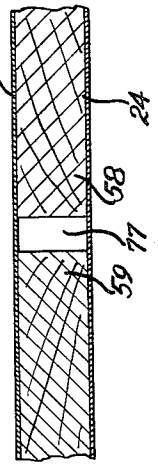


FIG. 7

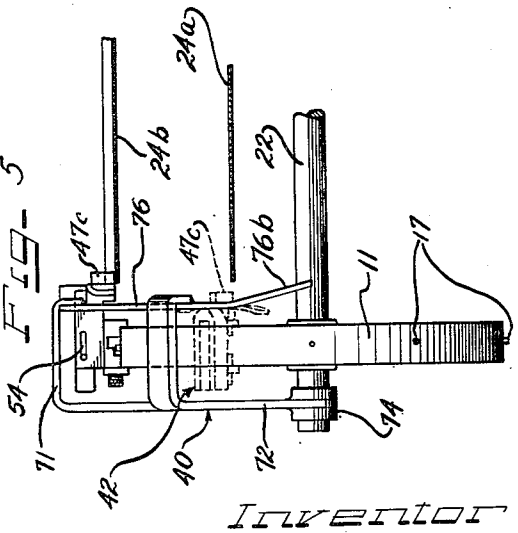


FIG. 5

Inventor
RICHARD N. WARE JR.

By Hill, Sherman, Meroni, Gross & Simpson Attys.

Sept. 4, 1956 R. N. WARE, JR 2,761,487

METHOD AND APPARATUS FOR MAKING WEB COVERED SPACED PANELS

Filed Sept. 21, 1954 2 Sheets-Sheet 2

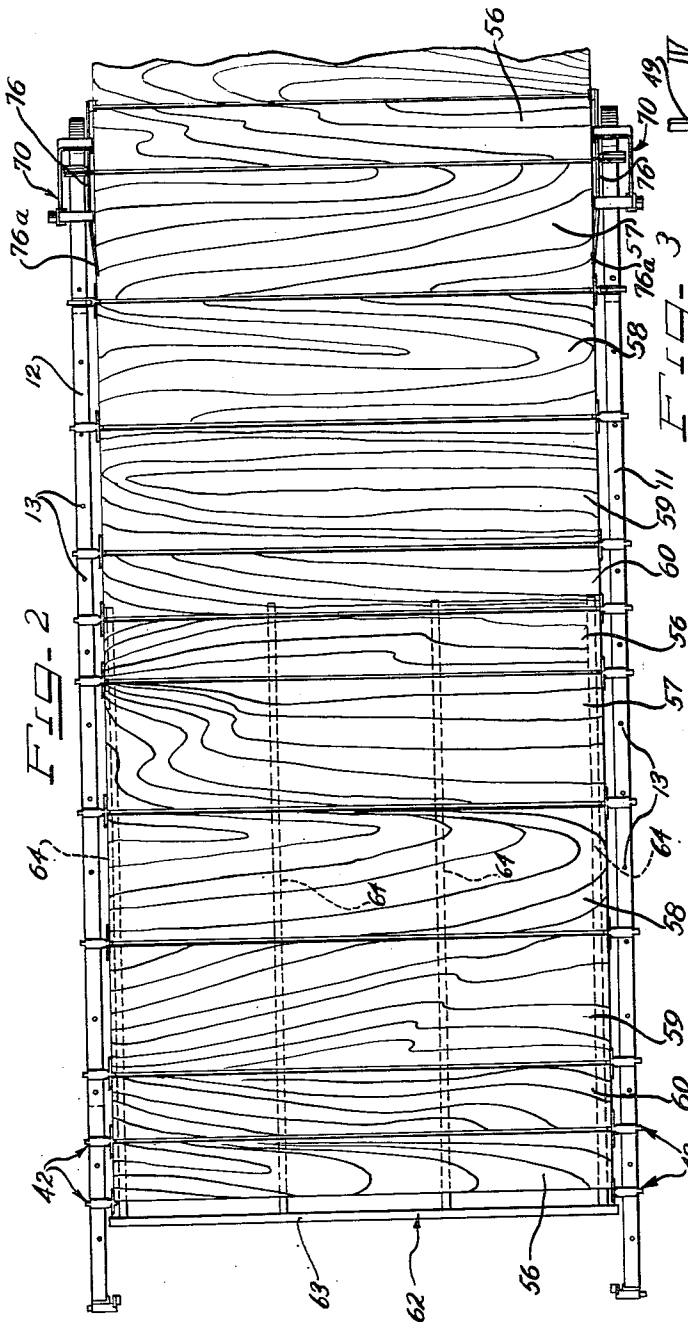


FIG. 2

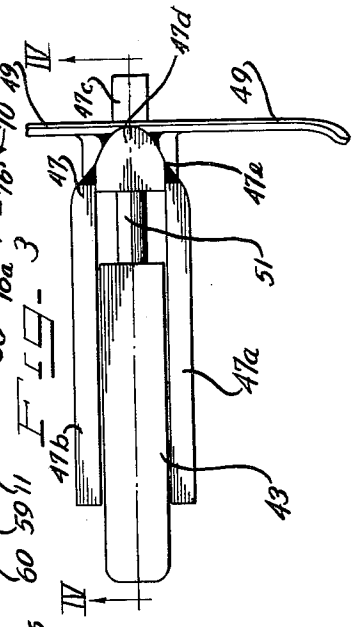


FIG. 3

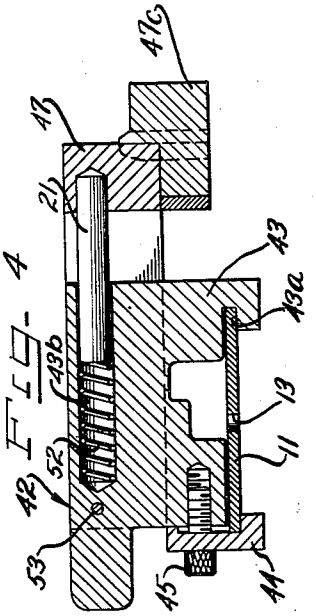


FIG. 4

Inventor
RICHARD N. WARE JR.

By Thiel, Thomas, Merris, Chandler & Jenner Attys.

United States Patent Office

2,761,487

Patented Sept. 4, 1956

2,761,487

METHOD AND APPARATUS FOR MAKING WEB COVERED SPACED PANELS

Richard N. Ware, Jr., Tallulah, La., assignor to Chicago Mill and Lumber Company, Chicago, Ill., a corporation of Delaware

Application September 21, 1954, Serial No. 457,485

10 Claims. (Cl. 154—1.6)

The present invention is concerned with the manufacture of wood reinforced blanks particularly useful for the manufacture of cartons and boxes.

The apparatus of the present invention is particularly designed to form folding box blanks consisting of a series of spaced wood veneer panels and covered on both surfaces with a continuous web of a heavy paper. The spacing between the individual panels is normally such as to provide a hinge when the blank is folded to form the bottom, sides and top of the completed carton or box. It should be appreciated, however, that the apparatus of the present invention will have more general applicability to the manufacture of wood reinforced paper compositions, regardless of the use to which the compositions are ultimately put.

In accordance with this invention, a series of wood veneer panels are deposited on a conveyor mechanism in a predetermined order, the conveyor mechanism being provided with individually positionable spacer elements which can accommodate, in spaced relation, a plurality of panels of varying widths. As the panels move along with the conveyor mechanism, one surface of the panels is covered with an adhesive coated paper web. Until such time as the web is able to support the panels, temporary support means are provided in conjunction with the conveyor mechanism to support the panels in their travel on the conveyor. Simultaneously with, or after the application of the first adhesive coated web to the panels, a second web is applied to the opposite surface of the moving panels. Means may also be provided in conjunction with the conveyor mechanism for disengaging the spacer means from between the individual panels at such time as the first applied web of paper is able to sustain the individual panels.

One of the principal objects of the present invention is to provide an apparatus for continuously applying one or more paper webs to a series of moving veneer panels, and providing a predetermined spaced relationship between the wood panels.

Another object of the present invention is to provide an improved apparatus for spacing wood veneer panels on a conveyor mechanism during the application of a web of paper thereto.

A still further object of the present invention is to provide a continuously operating mechanism for the application of paper surfaces to a series of wood veneer panels in a substantially automatic manner.

Another object of the present invention is to provide an improved method for manufacturing paper covered wood veneer panels.

Further objects and features of the present invention will be apparent to those skilled in the art from the following description of the attached sheets of drawings, which illustrate a preferred embodiment of the invention, and wherein:

Figure 1 is a generally schematic view of the conveyor mechanism and paper coating apparatus employed in the present invention;

Figure 2 is a plan view of the conveyor mechanism illustrating the manner in which the individual veneer panels are transported along the mechanism;

Figure 3 is a plan view of one of the spacer mechanisms employed in conjunction with the conveyor;

Figure 4 is a cross-sectional view taken substantially along the line IV—IV of Figure 3;

Figure 5 is a fragmentary end elevational view taken at the end of the conveyor mechanism, illustrating more particularly the release mechanism which releases the spacer means;

Figure 6 is a plan view of a series of panels in spaced relation as they appear after the application of one sheet of paper; and

Figure 7 is a cross-sectional view, on an enlarged scale, illustrating the structure of the finished box blank.

As shown on the drawings:

In Figure 1 the reference numeral **10** indicates generally a conveyor mechanism on which the wood veneer panels are initially received and on which a first web of paper is applied to the panels. The conveyor mechanism **10** may include a pair of endless flexible belts **11** and **12**, each of which includes a plurality of spaced sprocket holes **13** (see Fig. 2).

The belts **11** and **12** extend between spaced sprockets **14** and **15**, each of which has a plurality of equally spaced lugs **17** about its periphery (see Fig. 5). It will be understood that the belt **12** is provided with a set of sprockets similar to sprockets **14** and **15** so as to drive the belt **12** positively in synchronism with movement of the belt **11**.

The drive for the belts **11** and **12** is provided by means of a driven sprocket **19** and a chain **20** engaging the sprocket **19** and also a larger diameter sprocket **21**. The sprocket **21** and the sprocket **15** are preferably located on the same shaft **22**, so that driving the sprocket **21** results in driving the sprocket **15**.

The remainder of the mechanism schematically illustrated in Figure 1 consists of the paper-applying station. This portion of the assembly may include a paper supply reel **23** which supplies a web of relatively heavy paper **24**, such as kraft paper or the like. The web **24** passes over a glue applicator roll **26** which is partially immersed in a bath **27** of soya glue or other suitable adhesive.

After the application of the adhesive to the surface of the web **24**, the paper passes beneath tensioning rollers **28** and **29** and has a lower run **24***a* extending beneath the level of the upper surface of the conveyor mechanism. The lower run **24***a* passes over a reversing roll **31**, so that the adhesive-coated surface becomes uppermost. As a result, an upper run **24***b* of the web **24** has its adhesive covered surface in a position in which it can contact the moving veneer panels on the conveyor mechanism.

In passing beneath the upper surface of the conveyor mechanism **10**, the upper run **24***b* of the paper is slightly inclined upwardly so that while the paper is out of contact with the veneer panels as it initially leaves the periphery of the reversing roll **31**, the adhesive covered surface of the upper run **24***b* will come into contact with the moving veneer panels shortly thereafter. By the time the veneer panels leave the end of the conveyor mechanism **10**, they are capable of being fully supported on the paper web **24**, and pass into the nip between a pressure roll **33** and the tensioning roll **29**. At this juncture a second paper web is applied to the opposite surface. This second web **34** is fed from a supply roll **35** and passes under a glue applicator roll **36** whose surface is covered with a suitable adhesive flowing from an adhesive container **37**. After passing over a tensioning roll **38**, the paper web is reversed by passage over the pressure roll **33** so that as the paper web passes into

the nip between the rolls 33 and 29, the adhesive covered surface is pressed against the exposed surface of the wood veneer panels. As an aid in consolidating the structure, the paper covered veneer panels then pass into the nip between two positively driven pressure rolls 39 and 40 at the end of the paper applicator station.

The details of construction of the conveyor mechanism are best illustrated in Figures 2 to 5 of the drawings. Particularly from Figures 2 and 4, it will be seen that a plurality of spacer elements 42 are positioned in predetermined relationship along the belts 11 and 12. As best seen in Figure 4, each of the spacers 42 includes a body member 43 which is suitably grooved as indicated at 43*a* to receive one marginal edge portion of the belt 11 or 12. A generally C-shaped clamp 44 is secured to the body member 43 by means of a set-screw 45 to receive the opposite edge portion of the belt and clamp the spacer mechanism 42 tightly on the belt.

The forward end of the spacer member 42 includes a generally U-shaped support 47 having a pair of rearwardly extending arms 47*a* and 47*b* arranged to be freely slidable along the sides of the body member 43. The forward end of the support 47 has a generally rectangular lug or nose portion 47*c* the width of which determines the spacing between adjacent wood veneer panels in the completed product, and a pair of outwardly extending wings or flanges 49 which serve to line up the edges of the wood veneer panels so that they are brought into correct alignment with the nose portion 47*c*.

The support member 47 has a generally rounded portion 47*d* inwardly from and above the nose or lug 47*c* which merges with the arms 47*a* and 47*b* along a smoothly contoured camming surface 47*e*, the function of which will be apparent from a succeeding portion of this description.

The spacer members 42 are also provided with a detent mechanism by means of which the nose portion 47*c* can be retracted from between the wood veneer panels as the panels leave the conveyor mechanism, thereby eliminating the possibility of having the nose portion 47*c* tear the paper at the delivery or forward end of the conveyor mechanism. For this purpose, the body member 43 has a bore 43*b* which freely receives a pin 51 in sliding relation. One end of the pin 51 is permanently secured within a suitable bore provided in the support member 47. A spring 52 disposed in the bore 43*b* urges the pin 51 and hence the support 47 outwardly, so that the nose portion 47*c* in the normal position of the spring 52 is urged forwardly. A pin 53 extends through the body member 43 and is received within a pair of slots 54 (Figure 5) in the arms 47*a* and 47*b* of the spacer mechanism to limit the extent to which the nose portion 47*c* will protrude.

In commencing the operation, the spacer members 42 are positioned along the belts 11 and 12 in positions determined by the type of product being produced. The spacing of the spacer members 42 may be uniform or, in the more usual case, will be non-uniform. Where the paper covered wood veneer panels are to be employed in the manufacture of ordinary rectangular boxes, the spacing between the spacers 42 may be such as to accommodate a relatively narrow panel 56 which may form a top flap for the folded box structure, a wider panel 57 which may form a side wall, a relatively wide panel 58 forming a bottom wall of the blank, a relatively wide panel 59 forming the opposite side wall, and a relatively narrow panel 60 forming the opposed top flap of the carton assembly.

This arrangement, it will be realized, is strictly exemplary of the type which might be used in the manufacture of box blanks. For example, instead of providing separate panels 56 and 60 for the top flaps, a single piece having the width of twice the panel 56 or 60 can be employed if, following the assembly, the laminated product is cut along the center line of the double width panel.

The panels 56 to 60 are disposed in sequence along the conveyor mechanism 10, either by hand or by some auxiliary feeding mechanism. In order to support the panels 56 to 60 in their travel along the conveyor mechanism, there is provided a support rack generally indicated at 62 and consisting of a laterally extending framework 63 having associated therewith a plurality of longitudinally extending support arms 64. As best seen in Figure 1, each of the support arms 64 is gradually tapered forwardly from the frame member 63 and extends to about one-half of the run of the conveyor belts 11 and 12. As is also evident from Figure 1, the paper web 24 is applied to the wood veneer panels at a time when the panels are still supported by the support arms 64. In the portions of the web 24 beyond the support arms 64, however, the tension on the web 24 alone is sufficient to support the panels 57 to 60 in spaced relation. The gradual taper of the support arms 64 facilitates a smooth sliding of the panels off of the arms and onto the glued top face of the bottom web 24.

In cases where the web 24 is sufficiently strong to initially carry the panels as they are assembled between the spacers, the support rack 62 can be eliminated.

The spacer members 42 move with the belts 11 and 12, with the nose portions 47*c* disposed between adjacent panels until the end of the run of the belts 11 and 12, whereupon the nose portions 47*c* are retracted from between the panels, to prevent injury to the paper webs as the belts move downwardly around the sprockets 15. A suitable retracting means may take the form of a support bracket 70 having spaced arms 71 and 72 extending therefrom, the bracket 70 being provided with a collar 74 in which the shaft 22 is free to rotate. Fastened to the support arms 71 and 72 is an arcuately shaped release or cam member 76. The forward edge of the latter, 76*a*, is bent inwardly so as to be in a position substantially along the marginal edges of the moving wood veneer panels. As a spacer member 42 approaches the release arm 76, the bent-in portion 76*a* engages the spacer member 42 and travels along the camming surface 47*e* so that it becomes wedged between the rounded portion 47*d* and the edge of the wood veneer panel. As the belts 11 and 12 continue to move forwardly and downwardly, the nose portion 47*c* is retracted further and rides along the inside of the release member 76 until it is well out of the way of the paper runs. This condition is illustrated in the dotted line showing of Figure 5 which represents the retracted position of the nose portion 47*c*, of the spacer members 42.

As soon as the nose portion 47*c* passes beneath the lower run 24*a* of the web 24, the spacer member 42 will engage another inwardly inclined portion 76*b* of the release member or cam 76, so that the detent spring 52 will again urge the nose portion 47*c* outwardly.

After application of the second web of paper at the paper applying station, the wood veneer reinforced material can be processed in a variety of ways to improve the strength, moisture resistance, and other desired properties of the product.

The final carton blank is fragmentally illustrated in cross section in Figure 7. The two continuous paper webs 24 and 34 form the outer surfaces of the laminate, and the wood veneer panels 58 and 59 form the reinforcing medium. A space 77 between the panels 58 and 59 facilitates folding of the box and provides a hinge between the adjoining panels 58 and 59.

From the foregoing it will be seen that the apparatus of the present invention provides a substantially automatic, continuous means of fabricating paper covered wood veneer panel assemblies. 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. An apparatus for covering panels with a web which comprises a pair of spaced movable belts, a plurality of individually positionable spacers secured to said belts, spaced support means disposed between said belts and terminating short of the ends of the runs of said belts, said support means being arranged to support a plurality of spaced panels between said spacers so that said spacers move said panels along said runs in spaced relation, and applicator means for applying a web on the surface of said panels as they are advanced by the belts and spacers beyond said support means.

2. An apparatus for covering wood veneer panels with paper which comprises a pair of spaced movable belts, a plurality of individually positionable spacers secured to said belts, means forming a tensioned run of a paper web between said belts under panels between said spacers, to support the panels, means for advancing said run and belts simultaneously, and means for applying a second web of paper on the top faces of said panels.

3. An apparatus for covering wood veneer panels with paper which comprises a pair of spaced movable belts, a plurality of individually positionable spacers secured to said belts, a mechanism on each of said spacers for withdrawing said spacer from between two of said panels, means for applying a web of paper to one surface of said panels while said panels are located between said spacers, and a release mechanism near one end of travel of said belts arranged to engage the mechanisms on said spacers to move said spacers out of the path of said panels.

4. An apparatus for covering wood veneer panels with paper which comprises a pair of spaced movable belts having spaced sprocket holes, a pair of spaced sprockets engaging each of said belts to drive the same, a plurality of spacer means, means for attaching said spacer means to said belts, a mechanism on each of said spacer means arranged to move said spacer means out of engagement with said panels, means for feeding an adhesive covered web into contact with one surface of said panels while said panels are still between the spacer means, and release means arranged to engage and retract said mechanisms to thereby move said spacer means out of engagement with said panels.

5. An apparatus for covering wood veneer panels with paper which comprises a pair of spaced movable belts having spaced sprocket holes, a pair of spaced sprockets engaging each of said belts to drive the same, a plurality of spacer means, means for attaching said spacer means to said belts, a mechanism on each of said spacer means arranged to move said spacer means out of engagement with said panels, means for feeding an adhesive covered web into contact with the under surface of said panels while said panels are between said spacer means, and release means arranged to engage said mechanism to actuate said mechanism and thereby move said spacer means out of engagement with said panels.

6. An apparatus for covering wood veneer panels with paper which comprises a pair of spaced movable belts having spaced sprocket holes, a pair of spaced sprockets engaging each of said belts to drive the same, a plurality of spacer means, means for attaching said spacer means to said belts, a detent mechanism on each of said spacer means arranged to move said spacer means out of engagement with said panels, support means disposed between said belts and arranged to support a plurality of wood veneer panels between said spacer means, means for feeding an adhesive covered web into contact with one surface of said panels while said panels are still on said support means, release means located beyond said support means arranged to engage said detent mechanisms to actuate said detent mechanisms and thereby move said spacer means out of engagement with said panels, and a paper applying station beyond said release means arranged to apply a second web of paper onto said panels after said panels leave said belts.

7. A machine for making paper covered wood veneer box blanks composed of a series of spaced veneer panels covered by continuous paper webs bridging the spaces between the panels and forming folding hinges at said spaces which comprises means for forming a tensioned upper run of an adhesive coated web, belts having upper runs at the sides of said upper run of said web, spacers on said belts having retractable nose pieces adapted to project over the edges of the web to receive veneer panels on opposite sides thereof to control the width of the spaces between the panels, and means for retracting said nose pieces beyond the edges of the web before the end of the upper run of the belts.

8. The method of making paper covered wood veneer panels which comprises supporting a series of said panels in spaced relation on a plurality of elongated support means, moving said panels along said support means, applying the adhesive coated surface of an adhesive coated paper web to the underside of said panels while said panels are still moving along said support means, and removing said support means from between said web and said panels by relative movement between said support means and said panels.

9. The method of making paper covered wood veneer panel box blanks which comprises forming an upper run of an adhesive coated web, abutting successive veneer pieces against spacers traveling with said upper to form a series of spaced panels on said upper run, retracting the spacers from between the veneer pieces and beyond the web, covering the panels on the web with a second adhesive coated web, and bonding the webs to the veneer pieces.

10. The method of making folding box blanks comprised of web covered spaced panels which comprises forming a traveling uncovered run of an adhesive coated web, depositing a series of spaced panels on said run of the web, moving said web and said panels jointly while supporting said panels by the tension on said web, covering said panels with an adhesive coated second web, and pressing the webs on the panels to bond the assembly.

References Cited in the file of this patent

UNITED STATES PATENTS

1,461,724	Cooper	July 17, 1923
1,915,690	Nichols	June 27, 1933
2,075,795	Babcock	Apr. 6, 1937