Jan. 12, 1954 J. R. FRANCEK 2,665,460

EXPANDED WOOD VENEER

Filed Aug. 18, 1943

3 Sheets-Sheet 1

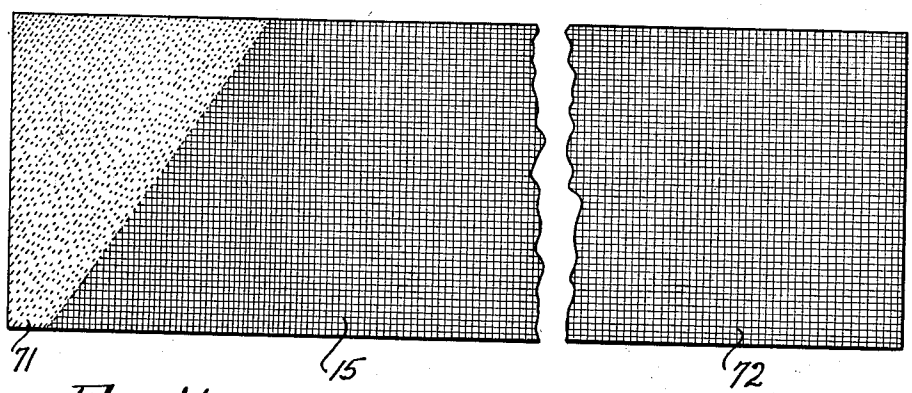



Fig 4

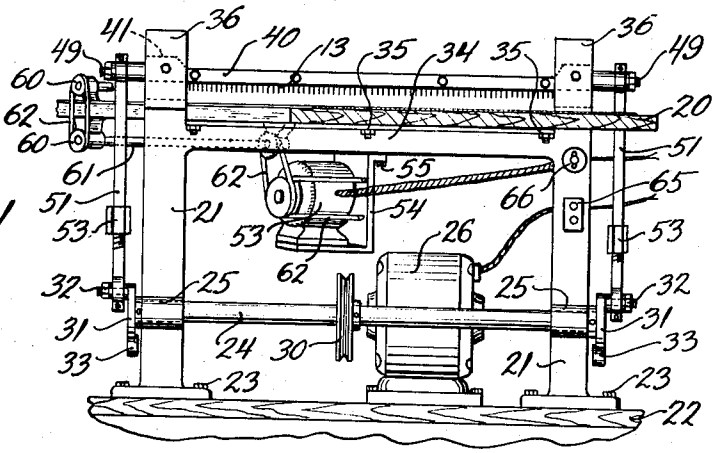
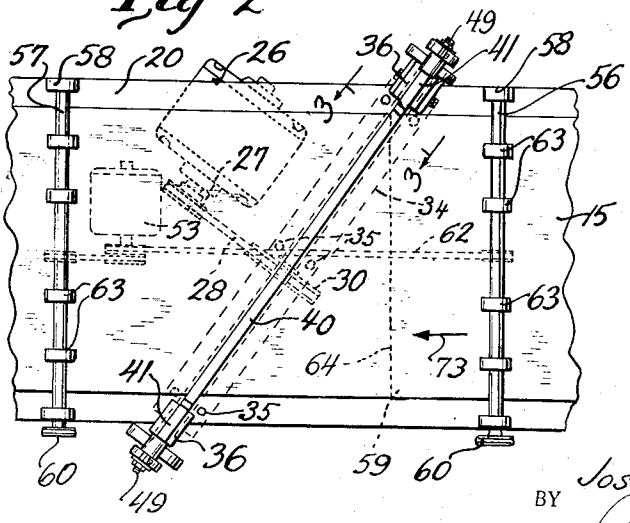



Fig 1

Fig 2




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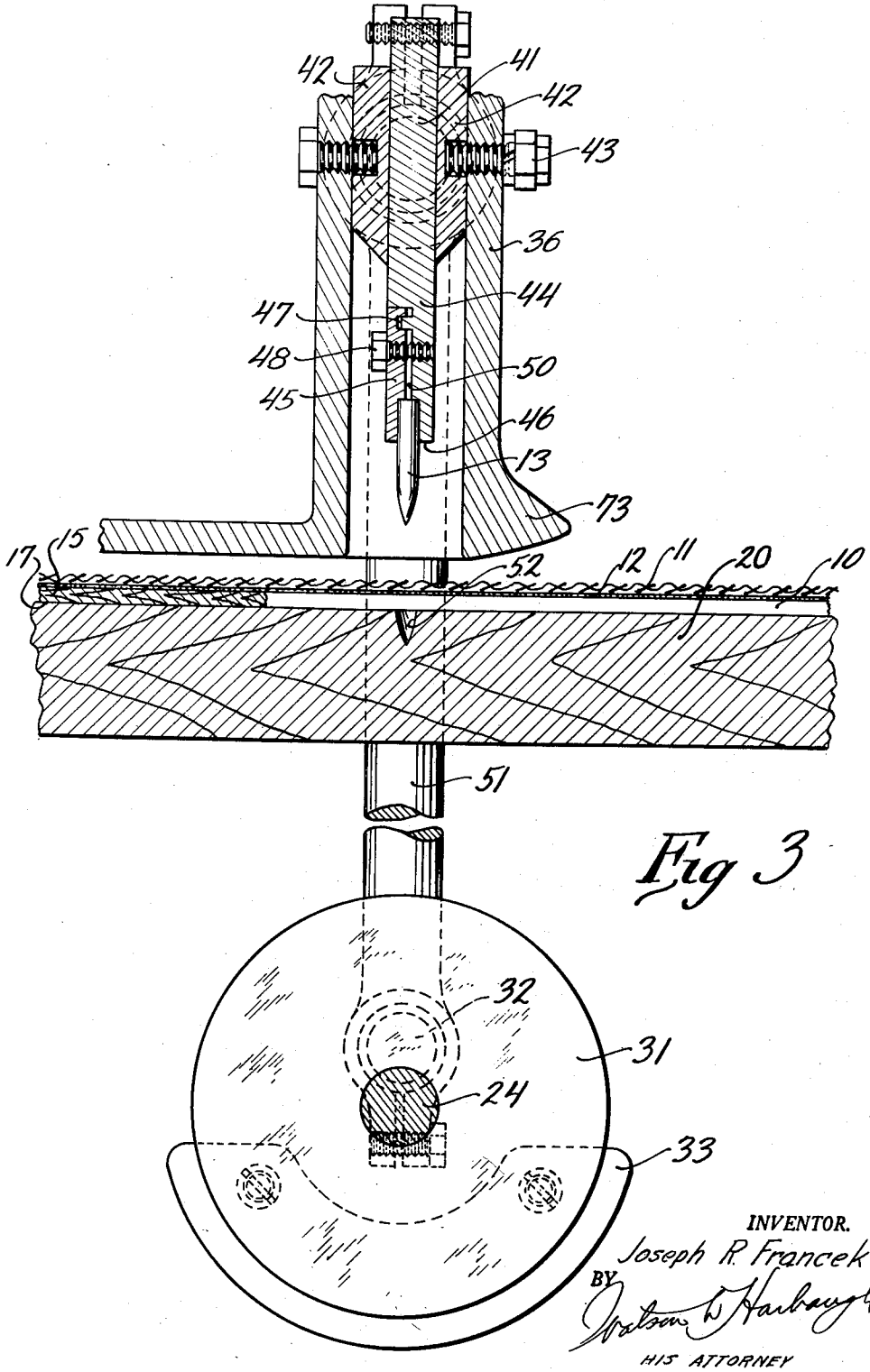



Fig 3

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EXPANDED WOOD VENEER

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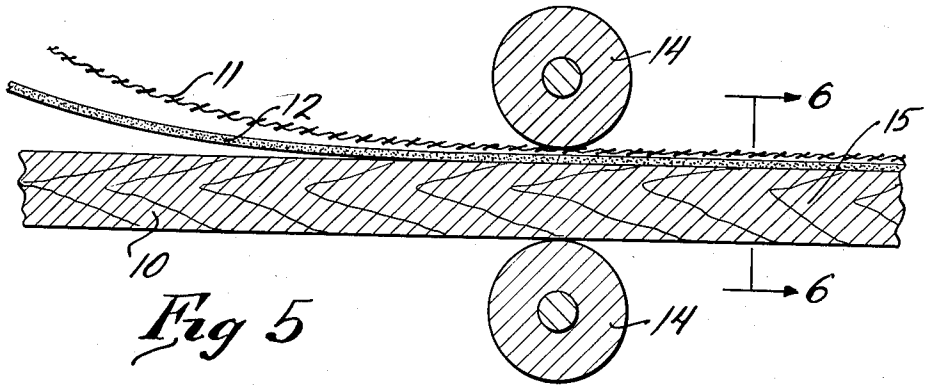



Fig 5

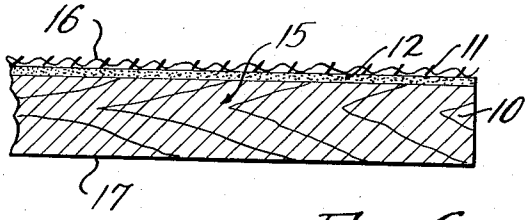



Fig 6

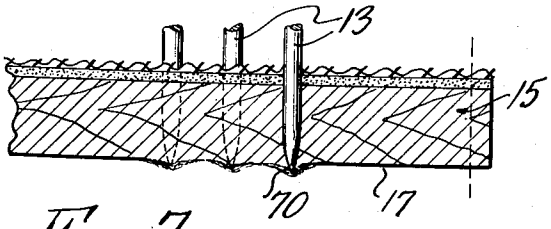



Fig 7

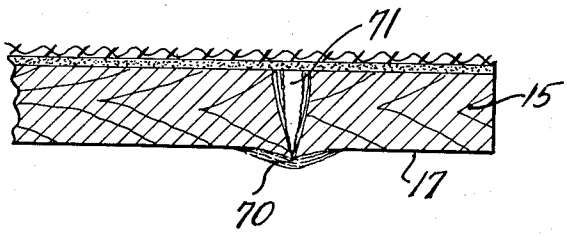
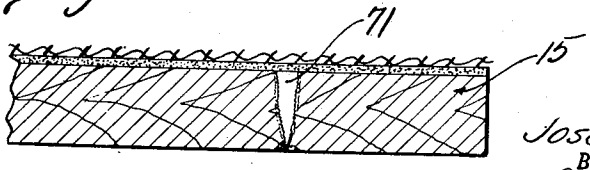



Fig 8

Fig 9




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# UNITED STATES PATENT OFFICE

2,665,460

## EXPANDED WOOD VENEER

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Application August 18, 1943, Serial No. 499,079

3 Claims. (Cl. 20—89)

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The present invention relates to wood veneers and more particularly to an improved wood veneer for covering walls or the like for purposes of decoration or finish and to a new and improved process for manufacturing wood veneers of the class described.

The present application is a continuation-in-part of Letters Patent No. 2,347,820 for the Dry Expansion of Wood Veneer, reference to which is hereby made.

It has been long desirable to have a wood veneer which could be applied to a wall surface or the like as easily as wall paper and which would simulate paneling and be just as enduring. The problem has been one to keep or prevent veneer from cracking, warping or buckling since the use of high gluing pressures available in applying wood veneer to a wall to establish the intimacy of contact and adhesion necessary to overcome the natural tendency of the wood veneer to exert itself under weather and moisture changes and other contributing factors present with walls finished with plaster or otherwise.

Wood veneering is produced in one of the well known manners by rotating a log against a cutter to shave a thin layer from the log in a manner that provides the best grain effect possible with each log. In many woods the grain is heavy; in others light. To bring out the grain, the lathe cut is preferably at an acute angle to and through the grain rather than vertical to or along the grain, thereby providing a decorative effect in which alternate portions of grain are separated by wood fiber.

This provides in the grain alternate portions of strong wood capable of bending and buckling and weak portions which yield to the action of the stronger parts and cause buckling, splitting and splintering.

It has been the practice in some instances to fracture the veneer before applying to the wall so that the predisposition to fracture is accomplished or taken care of before application to a wall and thereby the effect of an ultimate warping or curling of the grain is reduced. Such a process is one wherein the veneer is torn or split along lines extending along or following the grain as by drawing the veneer across a blunt edge to break it.

Such a flexing, however, merely augments the weakness of the veneer where it is already the weakest and does little if anything to the stronger parts of the wood to process them. After such veneer has been installed for a time, a person

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looking along the face of a wall to catch the refractions of light will see that the strong parts are left to and do buckle and spoil the desired mirror smoothness that is attained with veneer board paneling.

Furthermore, with such a process, the veneer is not expanded enough to prevent absorbed dampness expanding it further after installation and causing it to buckle.

One of the objects of the present invention is to flex the veneer uniformly throughout its expanse and to expand it without placing a strain on the weaker portions of the wood fiber which would cause the wood to split along grain lines.

Another object of the invention resides in a process for treating sheets of wood veneer or the like so as to prevent the same from contracting, expanding or warping after being applied to the walls.

Another object of the invention is to uniformly flex the wood throughout its expanse and expand it beyond its natural wet expansion limit.

A further object of the invention is to render the sheet of veneer flexible and expandible enough to allow for wall depressions and rises normally experienced with hand troweled plaster walls or floors.

Another object of the invention is to flex and expand sheets of wood veneer in a dry process prior to installation.

Another object of the invention is to perforate the wood veneer according to a predetermined pattern to flex and expand it and cause the grain to recover itself by dampening the surface to be finished enough that it can be sanded without splintering the fiber and when installed with a moist adhesive the grain settles permanently into its expanded position for final finishing.

A further object of this invention is to dry expand sheets of wood veneer without destroying the grain of the sheets.

Another object of this invention resides in the particular manner of spreading the rear surface of the veneer sheets by forcing pin points into or through the wood according to a predetermined pattern.

These being among the objects of the present invention, other and further objects will become apparent from the drawings, the description relating thereto, and the appended claims.

Referring now to the drawings,

Fig. 1 is a side elevation partly in section taken somewhat obliquely to a working table and illustrating a machine by which the proces is practiced;

Fig. 2 is a top plan view of a device illustrated in Fig. 1;

Fig. 3 is an enlarged vertical section taken upon the line 3—3 in Fig. 2;

Fig. 4 is a plan view of a sheet of fabricated veneer partly processed according to the teachings of the present invention;

Fig. 5 is a vertical section through a device illustrating the manner in which a sheet of veneer is prepared for processing according to the teachings of the present invention;

Fig. 6 is a section taken upon the line 6—6 in Fig. 5;

Fig. 7 is a vertical section illustrating the manner in which the sheet of veneer shown in Fig. 6 is processed;

Fig. 8 is a section of veneer as it appears after being processed in the manner shown in Fig. 7, and

Fig. 9 is a vertical section through the sheet of veneer diagrammatically illustrating the character of the sheet when it is ready for use.

In the practice of the present invention, the wood veneer, such as that illustrated at 10 in Fig. 5, is preferably backed with a sleazy fabric 11, such as cheese cloth, which is intimately adhered to the wood by an adhesive 12, preferably having a latex base. The back of the veneer is then perforated from the back through the cloth by means of a plurality of elements 13 so designed and located as to spread the fibers of the wood at predetermined places without regard to the grain or the presence or absence of hard portions in the wood at these places.

In adhering the fabric 11 to the veneer by means of an adhesive 12 the adhesion is preferably made under pressure, and heat, if desired, by rollers 14 such as those illustrated diagrammatically in Fig. 5.

The resulting product is indicated generally by the numeral 15 and will hereinafter be referred to as the veneer, the veneer 15 having a back surface 16 and a face 17 with the length of the veneer considered that dimension running with the grain and the sides of the veneer those edges which are disposed opposite to each other transversely of the grain.

Although the backing 11 is shown as cheese cloth, it may comprise felted fibers or other fabricated material having the characteristic of being sleazy enough to yield or permit the expansion of the veneer as accomplished by the process described herein without being weak beyond this expansion, the intimate adhesion provided and described being helpful in maintaining strength in the veneer along with the fiber or fabric. The felted fibers or fabric will serve successfully for the purposes contemplated when spread evenly, since it is desired that the backing be of a substantially uniform thickness throughout.

Although the veneer may be processed by hand with a single element or a plurality of elements carried by a hand driven block, it is preferred that this process be carried out by a machine as more particularly shown in the drawings wherein the preferred way of practicing the invention is illustrated as representative of others which persons skilled in the art may use for the same purpose. In processing the veneer 15 by power, a bar carrying a plurality of elements is reciprocated up and down to perforate the veneer in a predetermined manner as the veneer is fed under the bar.

For this purpose, as shown in Fig. 1, a bed 20 is supported by side frames 21 upon a floor 22 to which the frames are secured by bolts 23. A shaft 24 is journalled in the side frames by bearings 25 and is driven by a motor 26 through a motor pulley 27, a V belt 28 and a shaft pulley 30. The shaft 24 extends beyond the side frames 21 to receive crank wheels 31 having crank pins 32 and counter-weights 33.

A cross member 34 interconnects the uprights 21 of the frames near their upper end and to this member is secured the bed 20 by bolts 35, the side frames 21 extending above the bed upon opposite sides thereof in the form of bifurcated ends 36. As seen in Fig. 2, it is important to note that the bed is disposed obliquely to the cross member 34, the shaft 24 and the cross member 34 being much longer than the bed 20 is wide so that the bifurcated ends 36 may be located at points disposed diagonally across the bed.

The reciprocating bar already mentioned is indicated at 40 as mounted for vertical reciprocation in the bifurcated ends 36. For this purpose a follower portion 41 (Figs. 2 and 3) is provided at each end of the bar, and these followers are supported in sliding relationship between guides 42 held in place in the bifurcated ends 36 by means of bolts 43. Take-up for wear between the guides and followers are provided for in any suitable manner.

The bar 40 comprises two elements, the main element 44 and a secondary element 45 co-extensive with the main element at its lower edge 46. The secondary element 45 is pivoted to the main element 44 as at 47 along a line spaced from the edge. Bolts 48 are employed to secure the two parts of the bar 40 together, as shown in Fig. 3, at spaced points throughout the length of the elements to establish a clamping relationship between the elements at the edge 46.

The construction of the bar will be better understood by understanding the manner in which it is made ready for use in the machine. The two parts 45 and 44 initially are clamped together with a spacer (not shown) filling the space 50 between them. With the spacer in place the bar 40 has drilled in the lower edge 46 thereof a series of holes, which holes are of a predetermined diameter and of a uniform depth. The spacer is then removed and replaced by the pointed elements 13, already mentioned, which have a diameter substantially identical with the diameter of the holes originally drilled. With this arrangement the elements 13 are held in place by the clamping effort exerted by the bolts 48 to be carried by the bar 40 as a unitary part thereof as the bar is reciprocated, the reciprocation of the bar being accomplished by the crank pins 32, pitmans 51 interconnecting the crank pins 32 and the extension 49 upon the bar 40, as more particularly shown in Fig. 1.

The throw upon the crank 36 is sufficient to drive the elements 13 as deeply into the bed, as represented by the perforation 52 made in the bed 20 beyond the veneer face 17 of the veneer 15, so that maximum penetration may be had if desired, and the bed 23 is supported against this drive by the cross member 34.

Extension devices 53 (Fig. 1) are provided for the pitmans 51 to adjust the height of the bar 40 above the table to change the amount of penetration that the elements 13 will make in the veneer 15.

The veneer 15 is fed between the bar 40 and bed 20 with the back 16 thereof disposed towards the elements 13. In accomplishing this feed, a

double feed effort is exerted upon the veneer 15 to force it along the bed under the elements 13 so that the elements 13 do not strike the veneer necessarily in the same place twice. The feed arrangement which has worked successfully is one wherein a very slow speed motor 53 or transmission is mounted under the bed 34 by means of a bracket 54 secured to the bed by bolts 55. Two shafts 56 and 57 are journalled by bearings 58 above the level of the bed with one of the shafts 56 located transversely of the bed in front of the bar 40 and the other shaft 57 located transversely beyond the bar 40. These shafts are propelled by means of pulleys 60, a countershaft 61, and belts 62, and have mounted upon them rollers 63 which are disposed in frictional contact with the back 16 of the veneer 15.

It is desired that the rollers 63 upon the shaft 56 be smaller than those upon shaft 57 or that the shaft 56 be rotated slightly slower than the shaft 57 so that there is a slight slippage between the feed effort of the two shafts which tends to keep the veneer stretched, when feeding it in the direction indicated by the numeral 73.

In the feed operation, the veneer is fed under the rollers 63 on shaft 56 until the reciprocating elements 13 begin to engage one corner of the veneer at the leading edge diagrammatically illustrated by the broken line 64, reciprocation of the bar 40 having been started by turning on the control switch 65 for the motor 26. Then when the feed motor 53 is turned on by the switch 66, the veneer will be slowly advanced with more and more of the element 13 perforating the back during the reciprocating motions until the other corner 59 of the veneer reaches the elements. By this time the first corner is in the clear beyond the bar and can be manually led to the feed shaft 57 which then takes over the process of pulling the veneer enough to keep the feed tight. At this time it will be well to note that successive sheets of veneer are preferably tied end to end in one continuous strip if the veneer is backed by fabric. With such a tieing together the feed through the machine continues without need for feeding successive sheets by hand.

When the sheet is hit by the elements 13, all the elements strike simultaneously along a line oblique to the sides and grain of the veneer. In providing this relationship by which the series of elements 13 strike the veneer along a line oblique to the grain, as compared with directly cross-wise of the grain, adjacent elements do not obstruct each other in expanding the grain, but rather the material is free to split and expand laterally at each element. Considered another way, if only one element 13 was employed to strike the veneer at one time, the body of veneer proximate the split would be free to expand laterally under the splitting action of the element 13 unopposed except by the strength of the remote wood to oppose. On the other hand, if a second element 13 was located next to the first element at a right angle to the first, i. e. directly across the grain, the freedom of the wood to expand under the influence of one of the elements is opposed by the other as regards the displacement of the body of veneer between them. One element would prevent the wood expanding towards it under the influence of the other element, and vice versa. Of course, if the elements are spaced widely enough transversely of the grain expansion can be had, but the veneer would buckle between them and the efficiency of the machine would be reduced for each stroke of the bar as compared with the preferred arrangement.



In the preferred arrangement the elements 13 are arranged in a row disposed obliquely to the grain, then the wood adjacent and at right angles to each element is free to expand unhampered by adjacent elements, the expansion at one element taking place ahead or behind adjacent elements. The more oblique the row is arranged with regard to the grain, the greater is this freedom to expand, it being a corollary of the present invention that the degree of expansion imposed upon the veneer 15 can be controlled by the degree of obliqueness at which the row of elements strike the wood. Although one row of elements has been shown, two or more rows on a single bar or several additional bars may be employed so long as there is sufficient space between elements which happens to be crosswise of the grain to permit expansion. Optimum expansion is found where veneer is fed sidewise under the bar. However, due to some veneer being so long as to make it difficult to reciprocate a bar, the relationship shown has been found to be quite satisfactory.

Although a bar has been shown with pointed elements thereon, pin wheels or a wheel or bar may be used which have short knives therein, provided the principle is adhered to of not having perforations made simultaneous in the veneer crosswise of the grain close enough for expansion to be opposed by adjacent elements and provided if knives are used, they extend generally in the direction of the grain. Pins are preferred since they do not require the degree of obliqueness that knives would require.

A partly processed veneer piece is illustrated in Fig. 4 with the perforations in the back indicated by the numeral 70 and the unprocessed portion by the numeral 72, it being appreciated that the direction of obliqueness may be either left hand or right hand without departing from the spirit of the invention.

Consequently, although it is old to perforate veneer, even from the back side, the known methods of perforation do not expand the wood nor do they flex the wood as performed by the present invention since the perforations made conventionally were made transversely of the grain, whereas in the present invention the perforations which are made in the wood if made simultaneously in a series, are spaced from one another longitudinally of the grain sufficient to permit the dry expansion of the veneer transversely of the grain to a degree controlled by the degree of obliqueness.

Not only may the degree of expansion be controlled by the angle of the obliqueness, but also it may be controlled by the speed of the feed as translated into the closeness of successive perforations made in the veneer, and also by varying the depth to which the elements are driven into the veneer, the elements 13 preferably being pointed with a semi-blunt taper.

Referring now to Figs. 7, 8 and 9, it is indicated in Fig. 7 how the pointed elements 13 cause a raising of wood fiber upon the face 17 as at 70 where the elements 13 pierce the veneer 15 to expand it. Then, when the pointed elements 13 are withdrawn, as indicated diagrammatically in Fig. 8, this raised portion 70 is left as a roughening of the face 17, and the perforation 71 left by the element 13 shows up as a pin hole through

the veneer when the veneer is held between the observer and the like.

After expanding the wood by many of these perforations, the face 17 of the wood is rough with portions 70 and covered with minute openings depending upon the depth to which the elements were driven, the texture of the wood, and the closeness of perforations. The face of the veneer is dampened slightly to swell the fiber enough to close the minute openings on the face and then faced by some suitable smoothing operation as by a very fine sandpaper or rollers, after which the veneer is ready for installation upon a plastered wall or the like where, due to the flexing and expansion accomplished, as described, the veneer may easily be installed like wall paper and is not affected by humidity and temperature changes.

With the present process the veneer is expanded across the grain approximately ½ inch to a foot, depending upon factors already mentioned and this expansion is well beyond the extent to which it would expand if soaked in water. Because of this, once the veneer is upon the wall, wetness other than humidity does not have a tendency to expand it. In fact, before applying to the wall, the veneer is dampened slightly to assist in handling and the veneer can dry then upon the wall without splitting.

The span of the bar 40 is reinforced suitably to carry the load involved in driving the elements 13 into the veneer 15. Springiness in the bar cannot be entirely eliminated so the weight in the center of the bar is so arranged that as the piercing load is picked up by the pins centrally of the bar the terminal flex of the bar on its down stroke under the weight of the bar carries the work load of the pins and provides the effort necessary to drive the pins home, the speed of reciprocation and the weight of the moving masses being regulated for this purpose for optimum results.

The backing upon the veneer prevents the veneer from splintering and clogging the elements 13 and in order to free the elements from the veneer upon the up stroke of the bar 40 a combination shield and guide 73 holds the veneer 15 down after each perforation so that the veneer is free to be fed beneath the elements and have the perforations spaced according to any pattern that is predetermined by the speed of the feed, or, of the reciprocation in relation to the feed. The combination shield and guide 73 is illustrated in Fig. 3, whereas it is removed from the machine, shown in Figs. 1 and 2, so that the structure of the bar may be seen.



Consequently, although a preferred embodiment of the invention has been shown and described herein certain modifications and changes have been discussed and further modifications and changes may be apparent to those skilled in the art without departing from the spirit of the invention, the scope of which is commensurate with the appended claims.

What is claimed is:

1. An article of manufacture comprising a sheet of thin wood veneer and a sleazy backing adhered thereto, said article being characterized by a series of piercings made through the backing and sheet of veneer from the back face according to a predetermined pattern by which the wood fibers of the veneer have been spread transversely of the grain uniformly throughout its width.

2. The article defined in claim 1 wherein the openings of the piercings on the front face of the veneer are closed to provide a finishing surface.

3. An article of manufacture comprising a composite sheet of thin wood veneer and a sleazy backing adhesively secured thereto, said composite sheet being expanded transversely of the grain of the veneer throughout its width by a plurality of rows of minute registering piercings in the backing and in the wood fibers of the veneer made according to a predetermined pattern by which the wood fibers of the veneer have been spread transversely of the grain uniformly throughout the width of the sheet, with the piercings of said rows aligned diagonally across the grain of the veneer.

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