United States Patent

[11] 3,595,203

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[54] **APPARATUS FOR COATING EDGES OF PLANK MATERIALS SUCH AS PARTICLE BOARD PLYWOOD AND-OR PLATEN BOARD**
3 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **118/2,** 118/410, 118/415
[51] **Int. Cl.** **B05c 9/00**
[50] **Field of Search** ..... 118/410, 411, 3, 2, 415, DIG. 19

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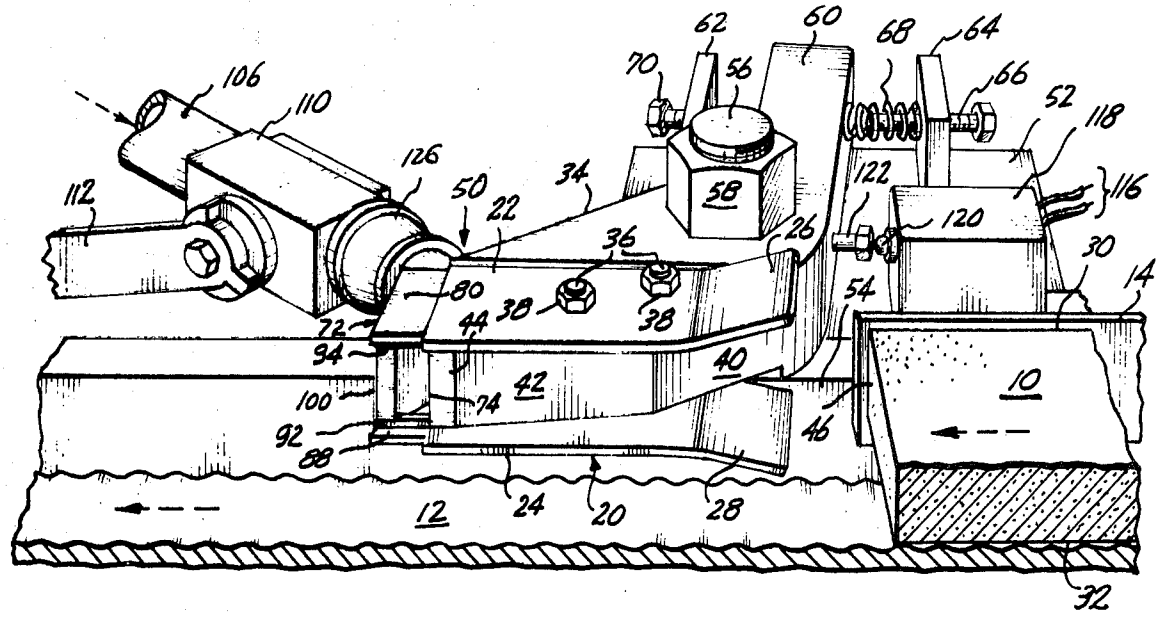
ABSTRACT: Edges of materials such as plywood and particle boards are coated and consequently sealed, producing an attractive edge appearance enhancing the utilization of such boards for shelving, etc. The apparatus and method used, continuously feeds a finishing substance having plastic properties into full contact with the edge of a board which is relatively moving by a pressurized emitting source of the plastic coating substance. This plastic emitting source structure confines the flow of plastic under pressure on board edges by utilizing a nozzle exit structure which has angular or beveled corners to receive the respective corners of particle or plywood board edges, etc., to thereby establish a uniform layer of coating across the width of the board edges without any plastic coating escaping to coat either the top or bottom surfaces of the boards.



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SHEET 1 OF 2

Fig. 1.

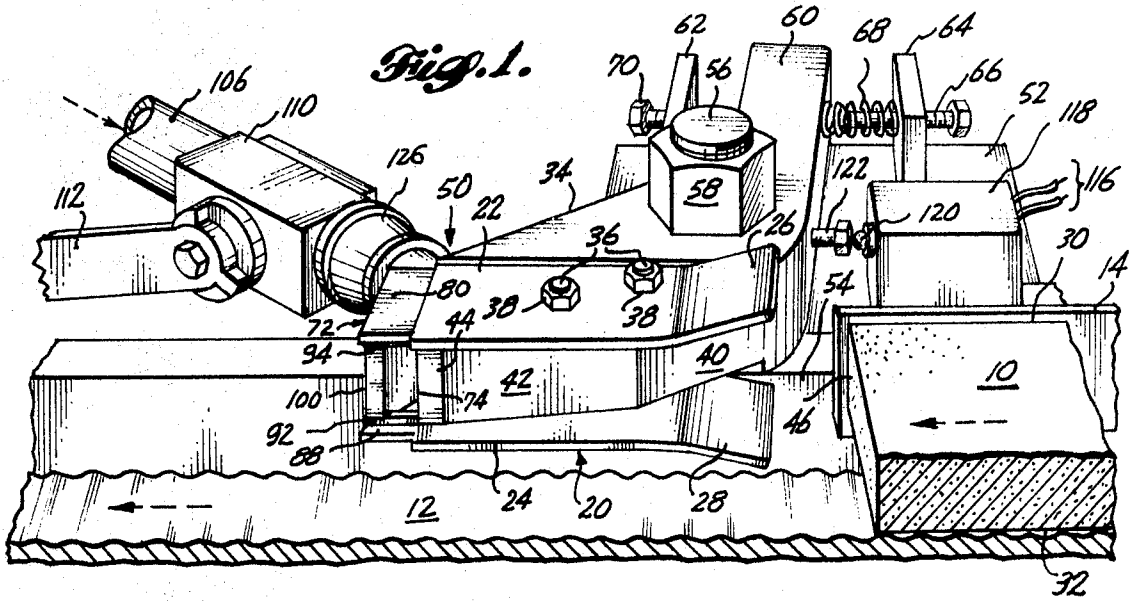


Fig. 4.

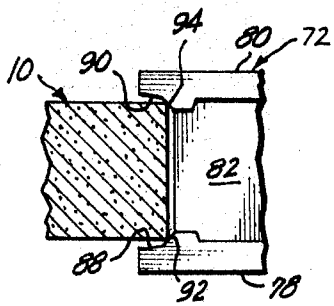


Fig. 2.

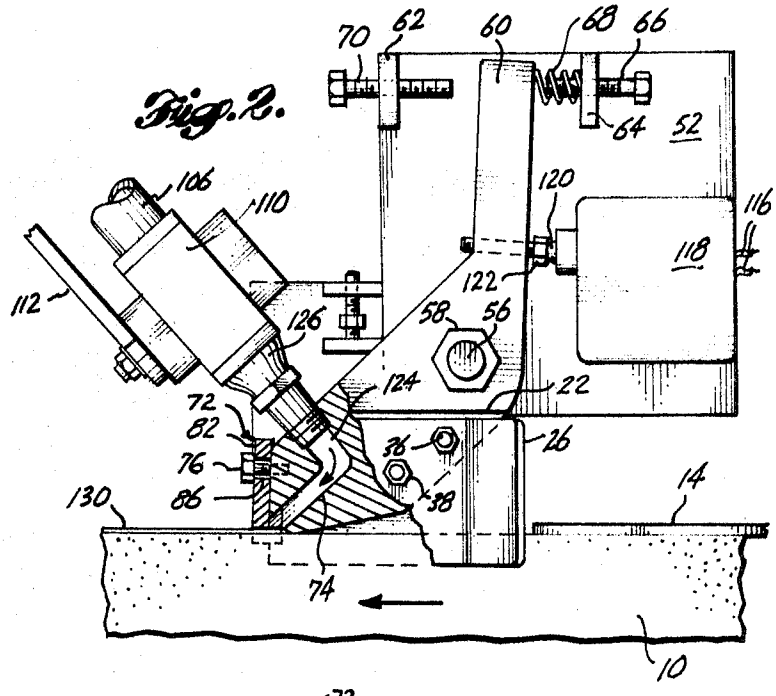
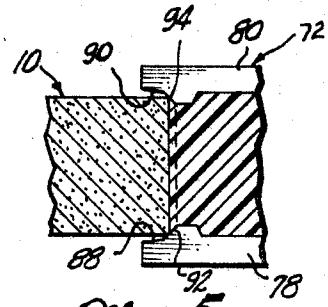


Fig. 5.



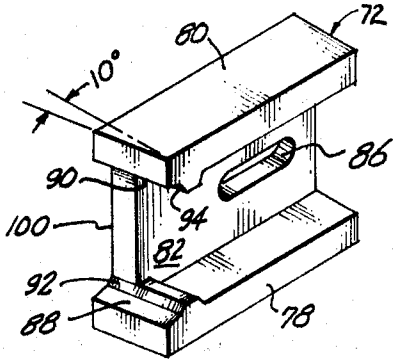


Fig. 3.

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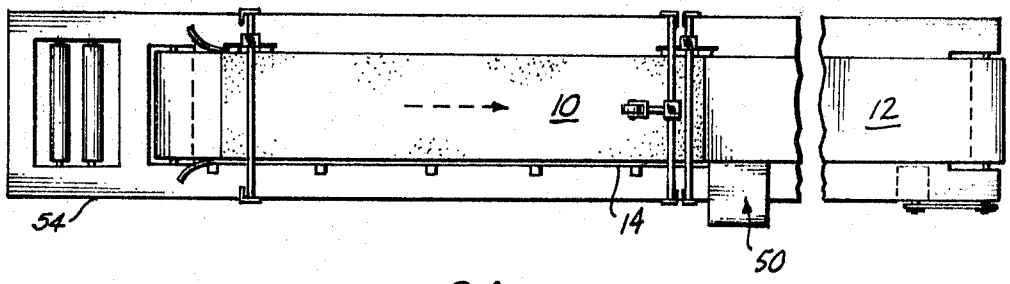

Fig. 6.

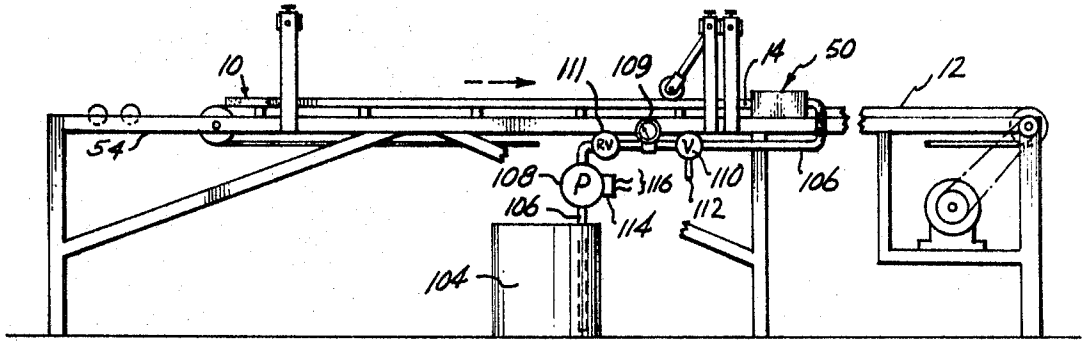

Fig. 7.

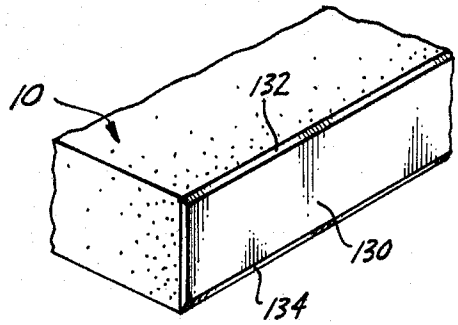

Fig. 8.

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APPARATUS FOR COATING EDGES OF PLANK MATERIALS SUCH AS PARTICLE BOARD PLYWOOD AND-OR PLATEN BOARD

BACKGROUND

Previously, some type of apparatus has been utilized to fill voids in plywood. See U.S. Pat. Nos. 2,860,597, 3,071,106, and 3,362,379. However, no apparatus has been previously constructed nor utilized to coat and consequently to seal edges of plank material such as particle board, plywood and/or platen boards, and not any portions of their respective top and bottom surfaces. thereby creating a finished edge surface that requires no further processing by anyone after this initial coating during manufacture.

SUMMARY

Final neat appearing fully coated, sealed edges of plywood, wood strips, particle boards, platens, chip boards, masonite, etc. are obtainable by relatively moving such sealed edge structures by a nozzle assembly through which a coating material of plastic consistency is controllably distributed under pressure across only the continuous face of the edge structure.

DRAWINGS

A preferred embodiment of the apparatus for coating, and sealing edges of strip, board and/or plank materials, such as particle board, plywood, and/or platen boards is illustrated in the accompanying drawings wherein:

FIG. 1 is a perspective partial view of the coating apparatus, with some portions removed;

FIG. 2 is a partial top view, with some portions removed, at the same location as shown in FIG. 1, to illustrate principally where and how the plastic coating is emitted;

FIG. 3 is a perspective view of the nozzle plate indicating the angularity;

FIG. 4 is a partial section view, taken at the nozzle plate in FIG. 2, before a plastic coating is pumped under pressure, to show how the edge to be coated is contacted and guided by the nozzle assembly;

FIG. 5 is a partial section view, taken at the nozzle plate in FIG. 2, as plastic coating is being pumped under pressure against the relatively moving edge of a particle board, for example, which is contacted and guided by the nozzle assembly;

FIG. 6 is a plan view of overall apparatus for production, with some portions removed, wherein the equipment shown in FIGS. 1,2,3 and 4 is incorporated into an edge coating or finishing conveyor assembly;

FIG. 7 is a side elevation view, with some portions removed, of the overall apparatus shown in FIG. 6, used in conveying strips, boards, planks, etc., by a nozzle assembly for applying a finished edge coating, illustrating the plastic supply system; and

FIG. 8 is a partial perspective view of a board after its edge has been coated.

PREFERRED EMBODIMENT

Nozzle Assembly

Throughout the views of the accompanying drawings, a preferred embodiment is shown which controllably moves and guides a board, strip, platen, etc. of plywood, particle board, etc., past its self-adjusting biased nozzle assembly from which plastic is continuously ejected under pressure on to the edge, only, of the moving board, strip, platen, etc. In this illustrated embodiment and in those of similar purpose, the predetermined coating thickness is maintained because the moving member is received and guided by a nozzle plate of the self-adjusting biased nozzle and contacts occur only at the corners of each edge surface of each member moved past the location where the plastic is emitted under pressure.

In FIGS. 1 and 2, a particle board 10 is illustrated moving from right to left while supported on a moving conveyor belt 12. As indicated later in discussing FIGS. 5 and 6, board 10 is guided to the staging location by fences 14, 16, at least one of which is laterally or transversely adjustable to guide boards 10 of respective preselected widths.

From this staging location, the board emerges from the fencing 14, 16, but only momentarily from unguided freedom, passing soon thereafter into a guiding subassembly 20 of several edge-guiding structures. Top and bottom surface guides 22, 24 are used with each having a flared respective up-and-down entry portion 26, 28 to meet and to guide the respective top 30 and bottom 32 surfaces of a board 10. These are optionally formed separately and then secured to a nozzle body 34 by bolt 36 and nut 38 fasteners. This nozzle body 34 has a succession of plane surfaces 40, 42 and 44 to meet and to guide the edge 46 of board 10.

To insure the uniform meeting and guiding of board 10 by contacting it about its edge 46, with this guiding subassembly 20, which is a part of an overall nozzle assembly 50, the latter is pivotally mounted to a frame member and/or bracket 52. Bracket 52 in turn is secured to structure 54 which movably supports the belt 12. A bolt 56 and nut 58 provide the pivotable mounting of this nozzle assembly 50. On the opposite pivotal end from the guiding subassembly 20, a lever arm 60 of the nozzle body 34 extends between two spaced abutments 62, 64 which are both secured to bracket 52. From the abutment 64 on the right, a support screw 66 extends outwardly for the purpose of centering and positioning a coiled spring 68 which is fitted under compression between lever arm 60 and abutment 64. The spring force pivots nozzle body 34, so the nozzle assembly and its board-edge-guiding subassembly 20 will always be biased into a receiving position to meet a new board and to remain in a preset position during coating of any board. This pivoting movement of nozzle body 34 under spring force is ultimately limited by an adjustable setscrew 70 threaded through abutment 62 on the left of lever arm 60.

This guiding subassembly 20 performs the last guiding and aligning function of board edge 46 before it is coated. After and during coating there remains an ultimate guide and alignment function to be performed. This is handled by using a guiding nozzle plate 72 to complete a nozzle passage structure 74 in nozzle body 34. It is secured to nozzle body 34 by threaded bolt 76. As indicated in FIGS. 3, 4 and 5, nozzle plate 72 has two opposite-hand sides 78,80 which are formed apart by creating a lateral structure 82 which receives the threaded bolt 76. The opposite-hand sides 78, 80 throughout their length extend beyond lateral structure 82. As extended, sides 78, 80 fit over the lateral extending portions 84 of nozzle body 34 to position nozzle plate 72 for securement by bolt 76 and to complete the passageway for the flow of the plastic coming through passageway 74.

The hole 86 in lateral structure 82 is oblong to allow adjustments to be made before bolt 76 is tightened. The adjustments made place nozzle plate 72 so that its opposite-hand sides 78, 80 perform the final board edge corner-guiding functions. Each side extends laterally, so its inside, 88, 90, formed on a slight bias, serves as receiving guide as shown in FIG. 3. In addition to the bias, each side, at the terminus of the slight bias, has an ultimate guiding and board edge corner-receiving surface 92, 94 formed on a 45° angular plane of limited width, previously referred to as a beveled or angular nozzle corner. The lateral structure 82 which receives the adjusting and holding bolt 76 through the oblong hole 86, laterally terminates to become in part the respective extensions 96, 98 of these ultimate guiding surfaces. Between these 45° angular plane extensions 96, 98, lateral structure 82 terminates in a plane surface 100. This surface 100 is also arranged along a 10° longitudinal angle, like the 45° angular planes 92, 94 on sides 78, 80 and the 45° angular plane extensions 96,98 on lateral structure 82.

This 10° angular direction coupled with nozzle body guiding surface 44 tends to controllably position the overall nozzle assembly 50 at this "following angle" in reference to board

movements, thereby avoiding chatter and assuring a uniform plastic fluid flow.

PLASTIC FLUID SUPPLY

As shown in FIGS. **6**, **7**, **1** and **2**, the plastic material **102** used to coat the board edges is pumped from containers **104** through conduit **106** as shown in FIGS. **6** and **7**. At some point in conduit **106**, a pump **108** is positioned, preferably having a 9 to 1 pressure ratio, preferably using a 50 to 450 pound increase, in supplying plastic **102** to nozzle assembly **50**. A pressure gauge **109** is connected into conduit **106**. As conduit **106** is about to terminate at nozzle assembly **50**, a shutoff valve **110** with handle **112** is conveniently positioned for shutting down the plastic flow when a production run is completed. Also located along conduit **106**, between pump **108** and pressure gauge **109**, a pressure-regulating valve **111** is installed. It is set to assure a uniform flow of plastic out of the nozzle assembly **50** and in doing so to eliminate flow pulsations caused by pump **108**.

During production runs the "on-off" sequences are automatically controlled by stopping and starting pumps **108**, which is selectively located along conduit **106** and equipped to be operated by its solenoid switch **114**. Solenoid switch **114**, in turn, receives its initiating signals through a circuit **116** controlled by contact switch **118**. Switch **118** is mounted on bracket **54** and positioned with its follower contact **120** so placed to be contracted by lever arm **60** of nozzle body **34**. To provide a means for adjustment nozzle body **34** is provided with a threaded bolt **122** to serve as a "cam" which contacts follower or pin **120** of switch **118**.

Therefore, when valve **110** is opened as pump **108** is connected to a plastic supply container **104**, when a board **10** contacts nozzle assembly **50**, pivoting its body **34**, lever portion **60** through cam bolt **122** bears against follower **120** to operate switch **118**. At this moment circuit **116** is activated resulting in switch **114** turning on pump **108**. Operation of pump **108** supply is plastic from container **104**, through conduit **106**, flow-regulating valve **11**, and valve **110** into the interior chamber **124** of nozzle body **34**, utilizing a threaded fitting **126**. Plastic flows under pressure from this interior chamber **124** into passageway **74**.

NOZZLE—GUIDE—DISCHARGE

As shown in FIGS. **1**,**2**,**3**, **4** and **5**, when plastic under pressure moves through passageway **74** it is guided by nozzle plate **72** which is also equipped to guide the board edge **46**. By utilizing this nozzle plate **72** with its "dual guiding function," a coating of plastic of preselected thickness is applied to board edge **46**. As particularly shown in FIGS. **3**,**4** and **5**, and also as earlier described, guiding nozzle plate **72** is formed to receive a board edge **46** of specified thickness by contacting only the top and bottom corners of this edge **46**. Such restricted contact leaves a space between board edge **46** and plane surface **100** of nozzle plate **72**. Through this clearance or resulting discharge orifice opening **128**, plastic **102** is continuously discharged as a surface coating for finishing only the edge **46** of board **10** as it moves by nozzle assembly **50** during a production run. The plastic coating material **102** does not flow beyond the locations of the contacts made between the corners of the board **10** and 45° guiding beveled or angular surfaces **92**, **94**, **96** and **98** on guiding nozzle plate **72**.

The functions of the prealignment fences **14**, **16**, followed by functions of guiding assembly **20** and finally followed by functions of guiding nozzle plate **72**, which is on the spring-biased nozzle assembly **50**, insures that the boundaries of the orifice opening **128** remain to constantly control the distribution of the applied plastic coating **130** in accordance with designated product specifications. The resulting coating **130**, as illustrated in FIG. **8**, has a beveled top and bottom edges **132**, **134**. This result improves the appearance of the finished board **10**. Also, during subsequent handling and use of a coated edge board **10**, the likelihood of the edge coating being bumped and chipped off at the corners is substantially eliminated.

MODIFICATIONS

Throughout the drawings some assemblies are shown as being derived from many parts. Some of these parts could be made originally as one part if for example, casting production techniques were to be followed in lieu of the illustrated machined part techniques. For example, the entire nozzle assembly might be formed as a unit where no adjustments were anticipated because of different board and/or plastic material production runs.

The beveled or angular guiding surfaces might also be curved to obtain a rounded appearance of the coated board edge.

Also for smaller production runs, the nozzle assembly might be held as a hand unit for movement along a board edge or other surfaces, for example, which might require a strip or embossed coating.

CONCLUSION

The apparatus and method illustrated and described, and in other embodiments has made it possible to coat a board edge leaving a final finish which requires no further operation. A uniform finish is obtained without creating any necessity to remove any excess along the edge or on either the top or bottom surfaces of a board near the edge that is coated.

Moreover, the coating is undertaken quickly by using apparatus that is easily operated and serviced and which is conveniently adapted to variable board thickness and different coating materials. For example, in one production run, 60 feet per minute of board lengths having a three-quarters of an inch edge, were coated, with plastic having a thickness of one-sixteenth to one-eighth of an inch, depending on the original board edge surface.

I claim:

1. Apparatus for high-speed product finishing of edges of boards such as particle board and plywood with a coating material comprising:

a. a conveyor means to receive and to move said boards past a discharge source of edge-coating material and having means for guiding said boards up to the point of application of said material;

b. a pressurized discharge source of flowable material comprising a nozzle assembly pivotally mounted to said conveyor means, spring means for biasing said nozzle into engagement with said edge of said boards, guide means on each side of said nozzle forming a channel, said guide means engaging the faces of said board adjacent said edge to guide said nozzle along the edge of said board, a guiding nozzle plate attached to said nozzle at the point of exit from said nozzle of the board for metering said coating only on the edge portion of said board, said guiding nozzle plate means having an open channellike contour, the rear portion of said channel being adjacent the edge of said board while the side portions of said channel partially overlie the faces of said board adjacent the edge, each of said side portions having diagonal surfaces adjacent the rear interior portion of the channel, said diagonal surfaces engaging the longitudinal corners of said board accommodating variations in thicknesses of oncoming boards and also controlling the flow of coating material, thereby creating beveled top and bottom edges of the overall finished edge having a thickness also determined by the clearance between the moving edges and the open channel of the guiding nozzle plate portion, and means to supply coating material to said nozzle at a point upstream from said nozzle plate portion.

2. Apparatus, as claimed in claim **1**, wherein in said means to supply coating material includes a pumping assembly having a tank, pump, distribution lines, valves, and controls, the latter being initiated by the moving particle board edges and

plywood edges so the pumping and pressurized application of the edgeycoating material continues until the particle board edges and plywood edges pass clear of the nozzle plate portion.

3. Apparatus, as claimed in claim 1, wherein the overall nozzle assembly and the guiding nozzle plate portion thereof have a bias perpendicular to the moving particle board and plywood to insure steady relative motion between them creating a resulting uniform finished edge.