

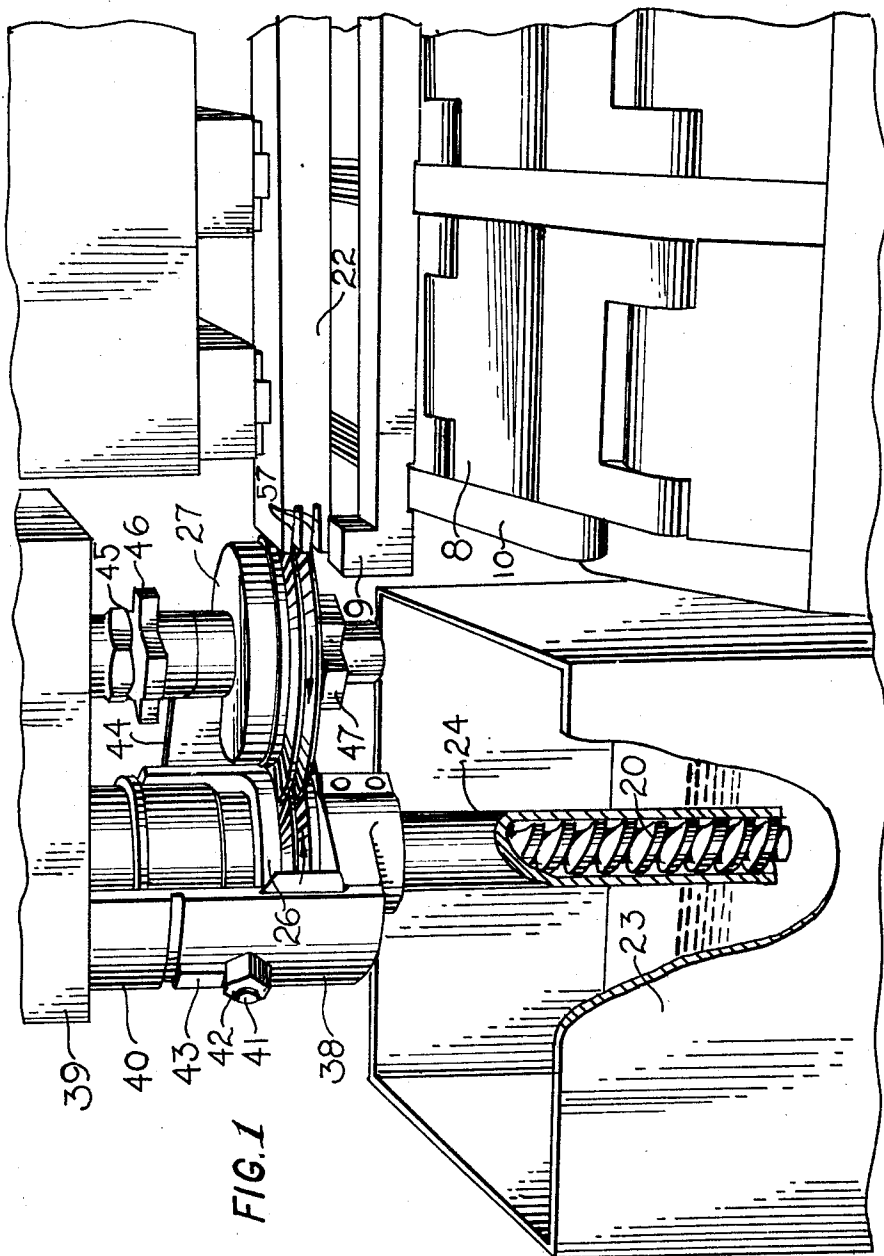
Sept. 22, 1959

C. E. YOUNG
GLUE APPLICATOR

2,905,141

Filed March 19, 1957

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

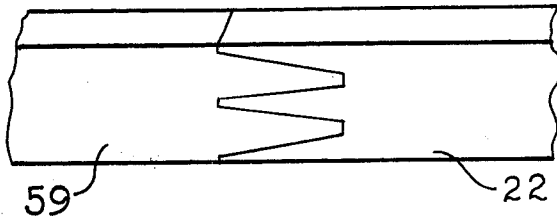


FIG. 2

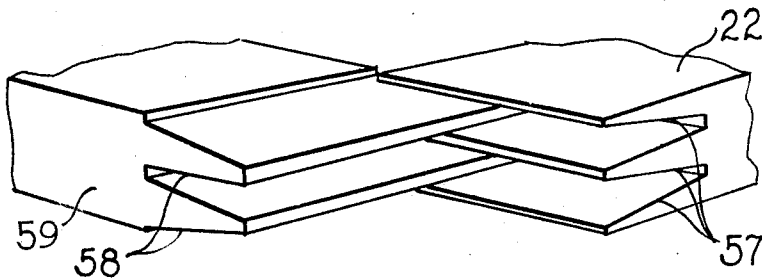


FIG. 3

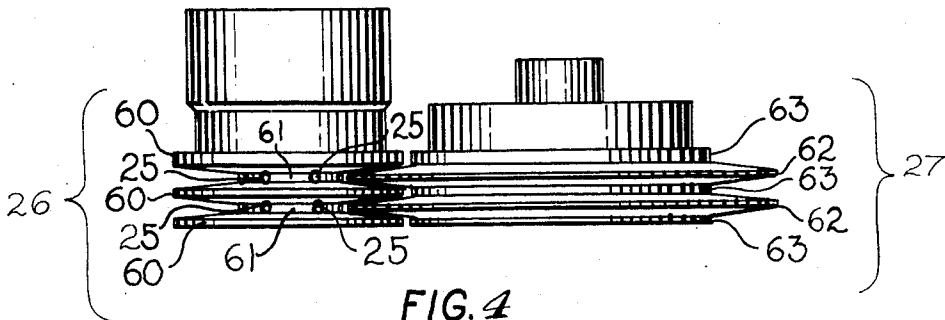


FIG. 4

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Filed March 19, 1957

GLUE APPLICATOR

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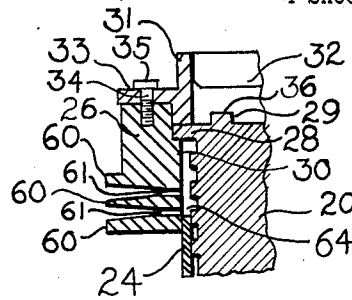


FIG.5

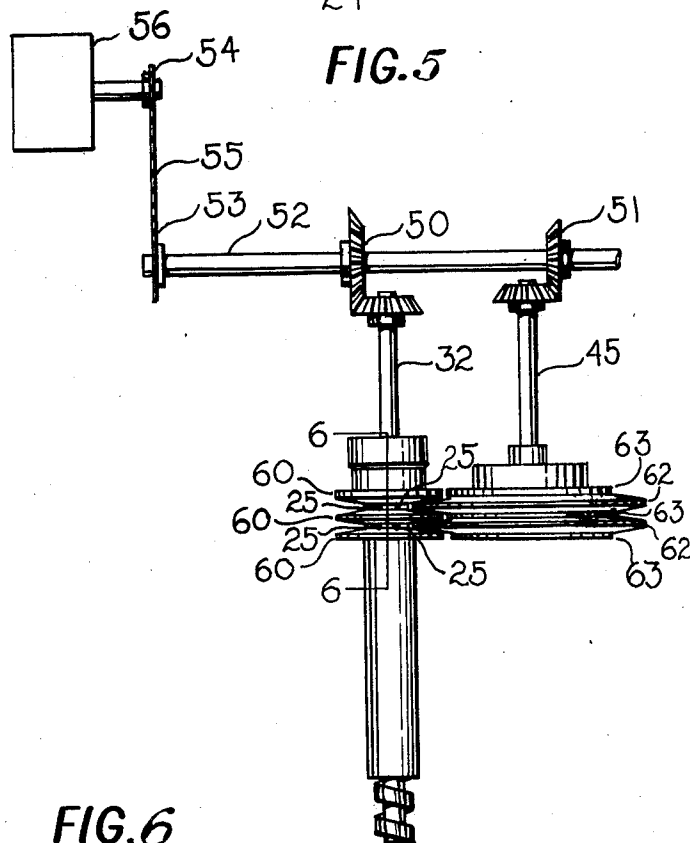


FIG. 6

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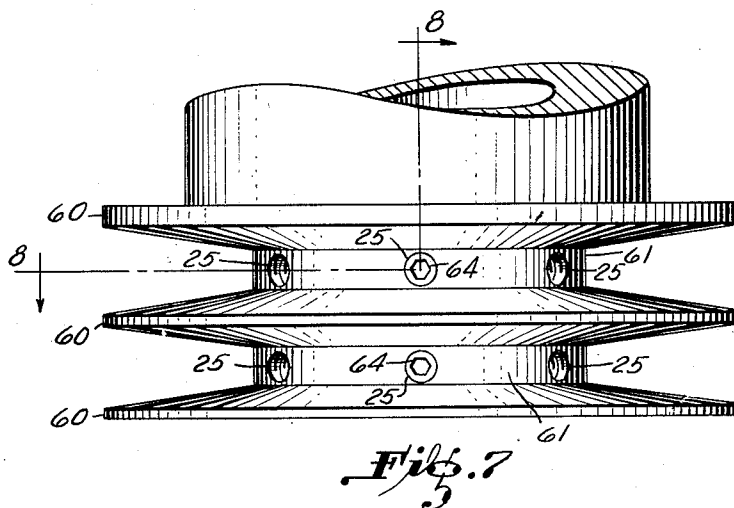


Fig. 7

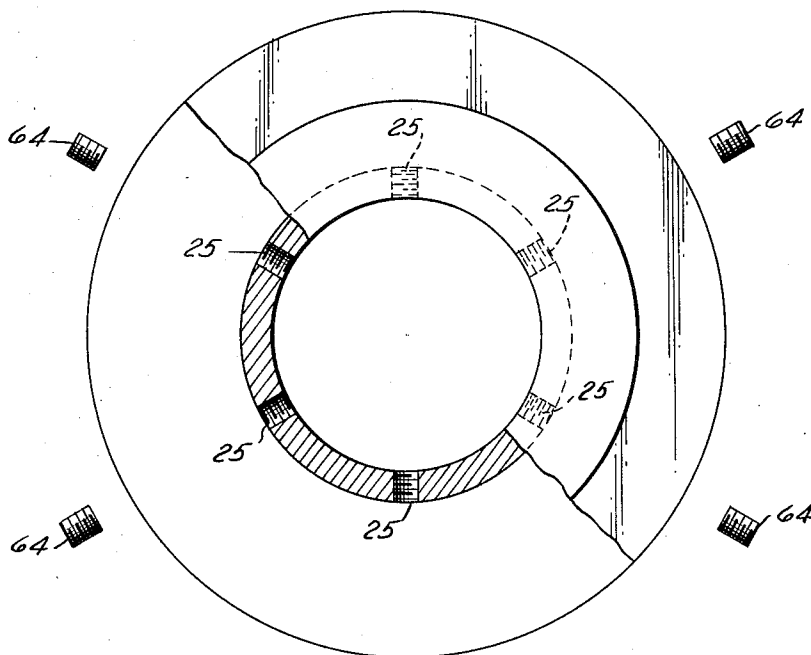


Fig. 8

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2,905,141

GLUE APPLICATOR

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Application March 19, 1957, Serial No. 647,080

3 Claims. (Cl. 118—244)

This invention relates to an improved glue applicator. More particularly, this invention relates to a glue applicator for applying adhesive to a patterned surface. It finds particular application in the lumber industry where in short pieces of stock with mating patterned ends are to be joined together.

Previous devices for applying adhesive to such pieces of lumber stock have had the disadvantages of being complicated in operation and difficult to adjust and control properly. Particularly for this use, close control of the amount of adhesive applied is of extreme importance. Mating patterns on ends of lumber stock are cut to close tolerances for assembly to prevent any occurrence of gaps in the finished splice and yet at the same time to prevent any splitting of the lumber stock when pressure is applied in joining the patterned ends. It is of equal importance that the amount of adhesive be sufficient to provide a uniform glue line and a strong bond and yet not be present in an amount to increase the hazard of splitting. This is particularly important where a scarfed finger joint is being used.

It is accordingly among the objects of this invention to provide an apparatus for applying adhesive which obviates the aforementioned difficulties as well as others in a thoroughly practical and efficient manner. It is a further object to provide in such apparatus, the qualities of simplicity of structure and operation, durability over extended periods of use, uniformly reliable performance, and efficient operation by relatively unskilled personnel. It is still a further object of this invention to provide an apparatus for applying adhesive which accurately provides just the required amount of adhesive in just the desired locations necessary for proper application to the material to be glued.

The aforementioned general object of my invention, together with others inherent in the same, are attained by the device illustrated in the accompanying drawings, throughout which like reference numerals indicate like parts:

Figure 1 is a perspective view, with parts broken away, of a glue applicator of this invention in connection with a part of an end splicing device for lumber.

Figure 2 is a perspective view illustrating in assembled form, one type of pattern used in end gluing lumber stock.

Figure 3 is a perspective view of the same type of pattern before assembling.

Figure 4 is an elevational view of a distributor roll and an applicator in meshing relationship.

Figure 5 is a radial cross-sectional view detailing the assembly of pump and distributor roll taken on the line 6—6 of Figure 7.

Figure 6 is a front elevational view of the assembled device.

Figure 7 is an enlarged front elevation of the distributor roll assembly of Figure 4. Figure 8 is a cross-sectional view of the distributor roll of Figure 7 taken on line 8—8 of said Figure 7 after rotating to take the openings

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25 off the vertical axis, and showing set screws disassembled therefrom.

Referring to said Figure 1 of the drawings, the conveyor mechanism for conveying pieces of stock such as 1 x 4's, comprises a deck 8 and traveling cleats or lugs 9 carried on the deck surface by continuous belts 10. The stock is moved transversely of its length by said traveling cleats 9 and under hold-down means 11. A motor, not shown, functions as a prime mover for driving a cut-off or trim saw. A motor, not shown, drives an edge cutting cutter head which may have a pattern thereon to make a scarf cut on an end of a piece of lumber stock conforming to the cutter pattern, such as that illustrated in Figures 2 and 3. As viewed in Figure 1 of the drawings, a piece of lumber stock will be traveling transversely of its length and with the surface on which glue is to be applied facing away from the viewer. Thus, the machine will be what is termed in the art as a left-hand feed, it being common to provide either right- or left-hand feed machines.

The particular assembly part 26 comprising this invention is attached to a base plate which is then fastened to the frame of the end splicer. It is preferred that the attachment of the base plate to the frame be such as to permit easy removal of the device of this invention should it be necessary to inspect the end splicer. One method found to be particularly practical is to attach one end of a vertical hinge while the body of plate is securely held in place by a bolt connecting plate and frame. A removal of the bolt permits the swinging of base plate and the attached glue applicator out and away from the end of the end splicer.

Referring now to Figures 1, 5, and 6, some of the parts of a device embodying this invention are shown in assembled relation in a perspective view in Figure 1, in a cross-sectional view in Figure 5 and in a front elevational view in Figure 6. The said parts are shown in Figure 1 immersed in a glue pot 23 which depending upon the type of glue being used may be jacketed or insulated for maintaining desired temperatures and which is preferably covered or screened to prevent contamination from particles of sawdust, slivers, etc., associated with a lumber operation. Glue is pumped upwardly from the glue pot 23 by means of a screw type pump employing screw 20 within tubular screw housing member 24. A patterned distributor roll 26 having a hollow core adapted to receive the glue emerging from the top of screw housing 24 is provided attached to the driving shaft of the pump screw 20. The said patterned distributor roll comprises a series of concentrically mounted discs 60 separated by concentric ring members 61 integrally mounted with the discs 60, the spaces thus formed between the discs 60 conforming to the pattern of the scarf cut of the lumber to be treated, such as illustrated in Figures 1, 2 and 3. A plurality of bored openings 25 (see Figures 4, 6, 7 and 8) are provided in the ring members 61 of the patterned distributor roll 26 leading to an annular chamber 64 forming a reservoir for the glue at the top of the pump housing 24 and encircling the top of the pump screw 20. So that the openings 25 will have free access to the glue reservoir 64, the pump housing 24 terminates at its upper end at a point just short of the top of the lowermost disc 60. The openings 25 are preferably uniformly spaced around the peripheries of the ring members 61. Glue that is pumped by screw 20 and out through openings 25 is caused to move outwardly over the surfaces of the disc members 60 of the distributor roll 26 by centrifugal force, and to spread evenly over the surfaces of the meshing discs 62 of coating applicator roll 27. The pattern on the applicator roll 27 is such as to mesh both with the pattern 57 on the end of the lumber stock 22 to which glue is to be applied and

with the conforming pattern formed by the disc members 60 on the distributor roll 26 and to match accurately with the pattern 58 on the end of lumber stock 59 illustrated in Figures 2 and 3.

It has been discovered that this accurate matching of the pattern of the distributor roll 26 with the pattern 57 on the end of the lumber stock 22 and the meshing with both by the applicator roll 27 results in depositing a uniform, thin layer of adhesive in the pattern 57 on the end of the lumber stock 22, sufficient to provide maximum glue line strength with complete joint closure without the dangers of wood splitting from uneven or heavy glue deposits when pressure is applied to complete the splice. By such a process the maximum efficiency of an end glue splicing operation is realized with a minimum of rejects or failures.

In operation the glue is applied directly to the vertical surfaces of the applicator discs 62 from the openings 25. It spreads out by centrifugal force into the spaces between the respective upper and under surfaces of the distributor and applicator rolls, and vice versa. It cascades down over the peripheries of the intermediate and lower distributor discs so that the vertical surfaces of the inner ring members 63 of the applicator roll thereby become wetted. The uppermost of the said inner ring members 63 becomes wetted by the glue traveling upwardly between the upper surface of the top applicator disc 62 and the under surface of the top distributor disc 60.

As the device of this invention requires the accurate matching and meshing of the patterns of the rolls with that of the lumber stock, it requires a structure that can be readily assembled or dis-assembled to provide for pattern changes. A further need for requiring such a structure is caused by the fact that most glues have a predetermined pot life requiring periodic cleaning of the various parts particularly after a shut down period. The device of this invention is extremely practical in that it provides for ready assembly and dis-assembly, and yet insures easy adjustment to provide the accurate meshing that is required for close control of a uniform glue line.

The details of such a construction are illustrated in cross-section in Figure 5. The screw 20 is provided with a flange 28 on the upper end thereof and said flange 28 carries a tongue 29. The screw 20 is supported within distributor roll 26 by the flange 28 resting on the shoulder 39. The coupling 31 is a driven coupling and is keyed to driven shaft 32 and provided with a flange 33 having two diametrically opposed key-like slots 34. As the assembled distributor roll 26 and screw 20 are moved upwardly the top surface of the distributor roll 26 fits against flange 33 and is held in place by screws 35 protruding through the flange 33 and interlocked in key slots 34 by angular movement. Tongue 29 fits into groove 36 in the bottom surface of driven coupling 31. The coupling 31 is held against vertical displacement by standard means such as two diametrically opposed set screws not illustrated. As the shaft 32 is a driven member, its rotating motion will be imparted by means of the keyed coupling 31 to the screw 20 by means of tongue 29 fitting in groove 36 and to the distributor roll 26 by means of the flange 33 and screws 35. As illustrated in Figure 1, tubular screw housing member 24 is supported by an adjustable suspended bracket 38. Gear box 39 is provided with an arcuate bracket 40 carrying a bolt 41 having a nut 42 threaded thereon. Bolt 41 slidably receives a groove 43 in bracket 38 so that upon loosening of the nut 42 the bracket 38 is slidable relative to arcuate bracket 40, and upon tightening of the nut 42 a desired adjusted relation between brackets 38 and 40 is obtained. This provides for longitudinal adjustment of the screw housing 24 within distributor roll 26 which is constructed for rotary movement about the screw housing 24.

It is preferred, though not essential, that a scraper 44 be provided for the peripheral surface of the glue applicator roll 27 with the scraping portion of the scraper

44 provided with a pattern accurately mating with the peripheral pattern of the glue applicator roll 27. It is preferred that the scraper 44 be adjustably attached to the arcuate bracket 40.

The applicator roll 27 is supported by and keyed to driven shaft 45 provided with threaded portions on which are mounted nuts 46 and 47. Upon angular movement of the nut 46, a stop is provided to determine the vertical position of the glue applicator roll 27, and upon tightening of nut 47 the glue applicator roll 27 is held in a desired adjusted elevational position.

In order to dis-assemble for cleaning purposes it is only necessary, after first removing the glue pot, to loosen nut 42 permitting bracket 38 and screw housing 24 to be lowered away from the screw 20. Then screws 35 are loosened and nut 47 removed and with an angular movement aligning screws 35 for passage through slots 34, the assembly of distributor roll 26, screw 20, and applicator roll 27 can be lowered together. The screw 20 can then be moved upwardly out of distributor roll 26 and the individual parts can be readily treated with suitable cleaning solutions or cleaning apparatus for removal of any glue residue.

The accurate matching of the pattern of distributor roll 26 with the pattern 57 on the end of lumber stock 22 and the close meshing of the pattern of the applicator roll 27 with both distributor roll 26 and lumber stock 22 provides a constant and accurate control of the maximum quantity of adhesive being applied to the pattern end 57 of lumber stock 22. The quantity of adhesive supplied to distributor roll 26 is adjusted and controlled by varying the distance between the top surface of tubular member 24 and the openings 25 (Figures 4 and 5) in the distributor roll 26. The openings 25 are, furthermore, provided with threads for inserting set screws 64 (Figure 8) therein thus to plug some of the openings and reduce the quantity of adhesive being provided. Where required, because of the particular properties of an adhesive, control of the amount of adhesive being supplied may be easily and quickly adjusted by substitution of a different kind of screw 20 designed for that adhesive.

In a preferred embodiment of this invention distributor roll 26, rotated by driven shaft 32 turns in a counterclockwise direction while applicator roll 27 rotated by driven shaft 45 turns in a clockwise direction so as to be moving in the same direction as the linear flow of lumber stock 22 through the end splicer (see Figures 1 and 6). Gears 50 and 51 on driven shaft 52 provide ratios for maintaining the peripheral speed of distributor roll 26 at a slightly higher rate than that of applicator roll 27 to provide a slight wiping action between the two rolls. Sprockets 53 and 54 and chain 55 transmit the drive power from power source 56 to driven shaft 52. By providing various ratios of sprockets 53 and 54 the peripheral speed of applicator roll 27 is adjusted to approximately that of the linear speed of lumber stock 22 so as to transfer the adhesive layer by contact without wiping to prevent excessive adhesive on the edges of the pattern and compressing of adhesive into the wood and away from a desired glue line.

Although for purposes of illustration I have shown and described one embodiment of the end glue applicator of my invention, it will be understood that the invention is not limited thereto since it is capable of numerous variations as to details of construction and as to type and character of the articles with which it is employed. The invention is, therefore, to be defined primarily by the claims appended hereto.

What is claimed is:

1. In a glue applicator device comprising a driven patterned glue distributor roll consisting of a series of superposed concentric discs spacedly separated by ring members and mounted on a vertical drive shaft and a meshing driven glue applicator roll consisting of a similar series of superposed concentric discs spacedly separated by ring members and mounted on a separate vertical drive

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shaft so positioned with respect to each other that the spaces between the meshing members of said distributor and applicator rolls control the glue spread by the applicator roll on the surfaces of the object to be glued; the improvement which comprises glue delivery openings positioned in the separating rings between the discs of the glue distributor roll and a tubular shaft containing a pump screw leading to the central portion of the distributor roll for delivery of the glue from a sub-positioned reservoir, said openings being spacedly positioned around the periphery of the separating rings so as to cause the delivered glue to flow uniformly by centrifugal force from the central portion of the distributor roll outwardly between the distributor discs and onto the contiguous faces and edges of the meshing applicator discs.

2. In a glue applicator device comprising a driven patterned glue distributor roll consisting of a series of superposed concentric discs spacedly separated by ring members and mounted on a vertical drive shaft and a meshing driven glue applicator roll consisting of a similar series of superposed concentric discs spacedly separated by ring members and mounted on a separate vertical drive shaft so positioned with respect to each other that the spaces between the meshing members of said distributor and applicator rolls control the glue spread by the applicator roll on the surfaces of the object to be glued; the improvement which comprises glue delivery openings positioned in the separating rings between the discs of the glue distributor roll, said openings being spacedly positioned around the periphery of the separating rings so as to cause the delivered glue to flow uniformly by centrifugal force from the central portion of the distributor roll outwardly between the distributor discs and onto the contiguous faces and edges of the meshing applicator discs, a tubular shaft containing a pump screw leading to the central portion of the distributor roll for delivery of the glue from a sub-positioned reservoir, and means to adjust said openings so as to deliver the desired amount of glue.

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3. In a glue applicator device comprising a driven patterned glue distributor roll consisting of a series of superposed concentric beveled discs spacedly separated by ring members and mounted on a vertical drive shaft and a meshing driven glue applicator roll consisting of a similar series of superposed concentric beveled discs spacedly separated by ring members and mounted on a separate vertical drive shaft so positioned with respect to each other that the spaces between the meshing members of said distributor and applicator rolls control the glue spread by the applicator roll on the surfaces of the object to be glued; the improvement which comprises a glue delivery system for the distributor roll comprising a vessel containing glue positioned below the distributor roll, a pump screw mounted on the drive shaft of the distributor roll and having its free end immersed in the glue solution, a tubular housing enclosing the pump screw from a point just above its free end to a point just below the top of the lowermost disc of the distributor roll, an annular chamber above the said housing and encircling the top of said screw pump, and openings leading into said chamber through the ring members separating the distributor roll discs for delivery of the glue from the said annular chamber to the spaces between the discs of the distributor roll, said openings being spacedly positioned around the periphery of the separating rings so as to cause the delivered glue to flow uniformly by centrifugal force from the central portion of the distributor roll outwardly between the distributor discs and onto the contiguous faces and edges of the meshing applicator discs.

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