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2,989,940

GLUING APPARATUS

Filed May 26, 1958

3 Sheets-Sheet 1

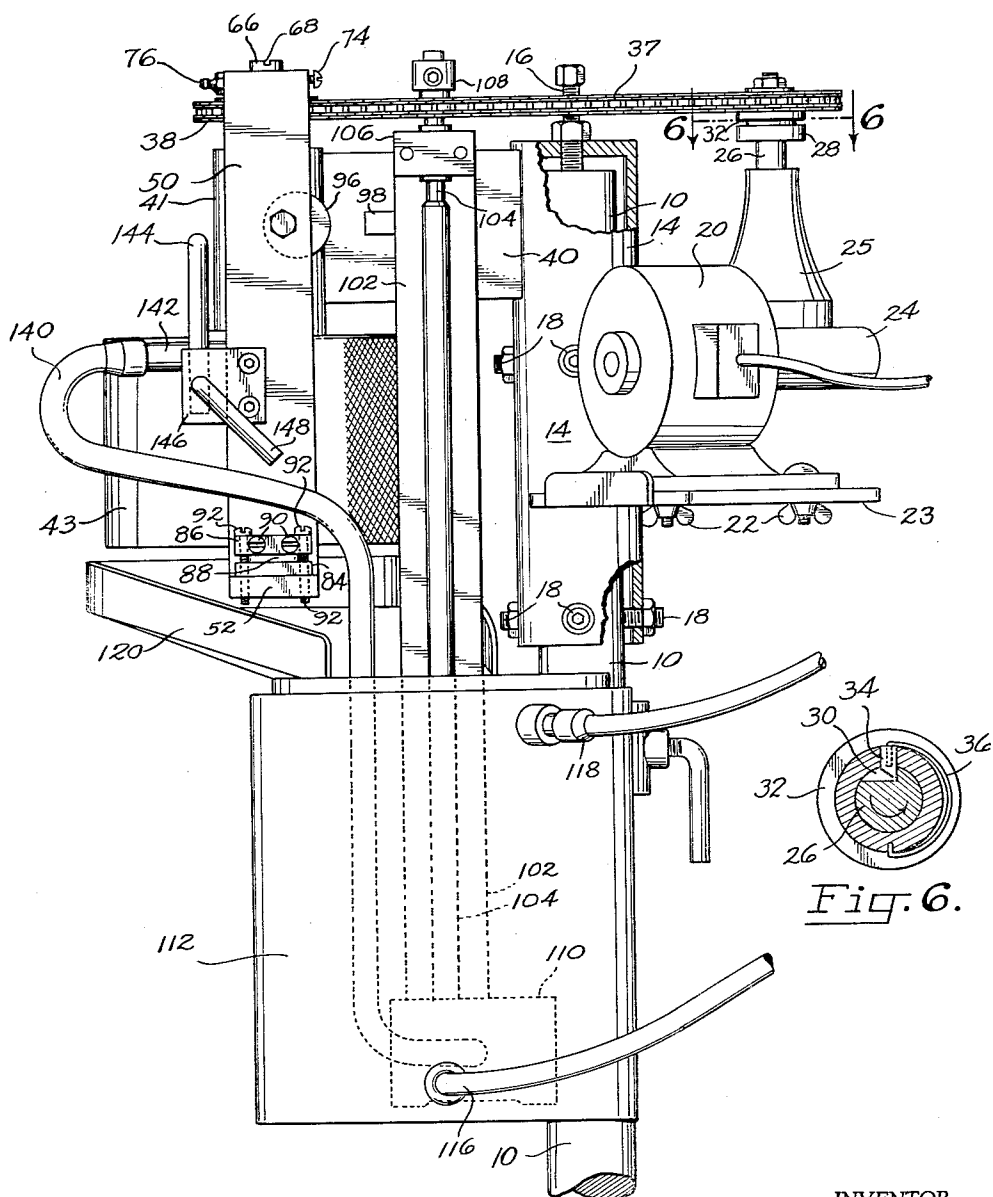


Fig. 1.

Fig. 6.

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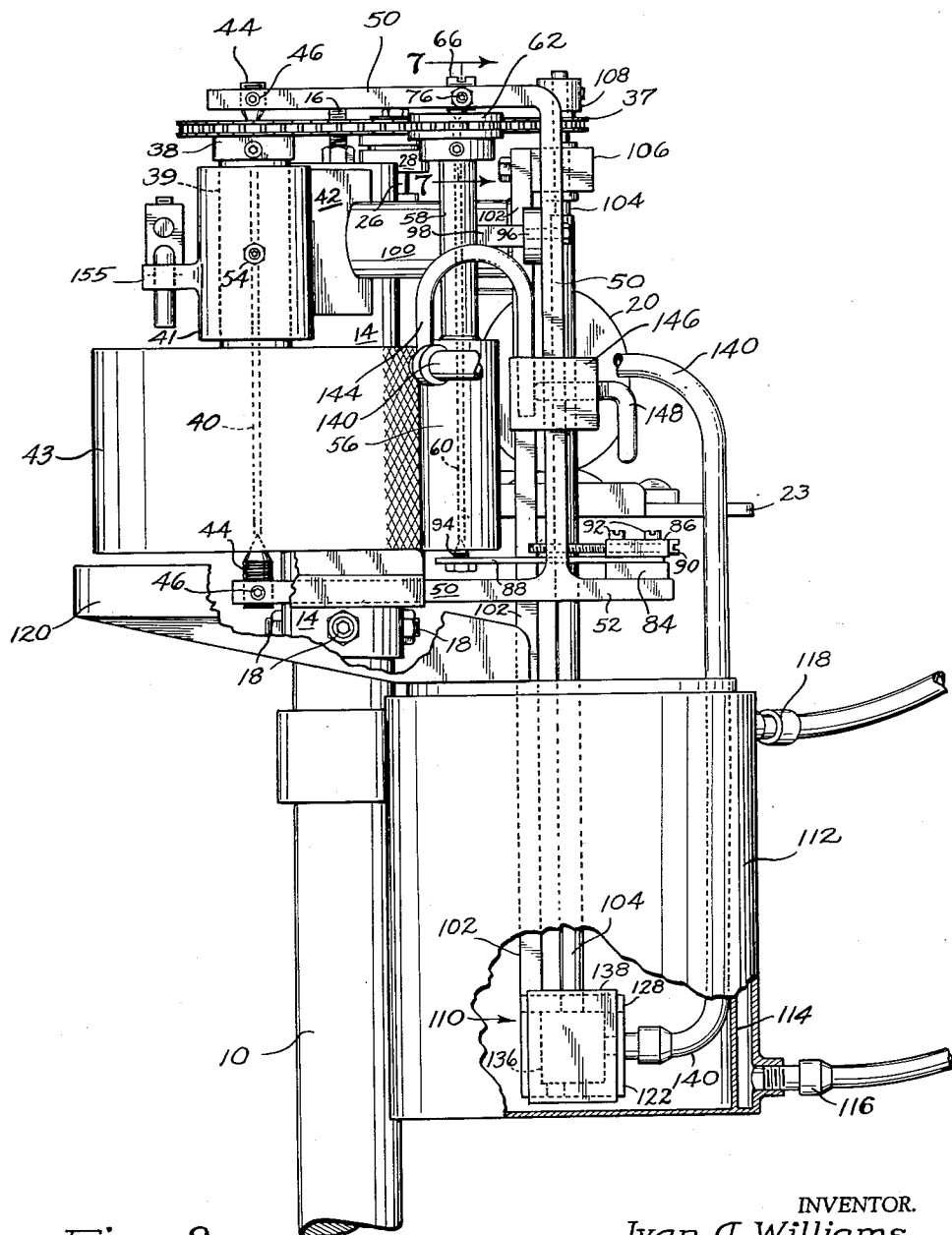


Fig. 2.

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Fig. 4.

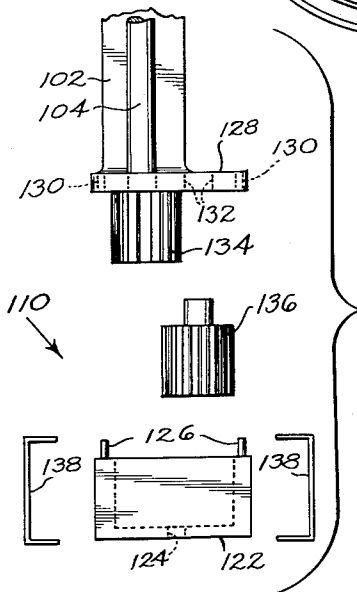


Fig. 5.

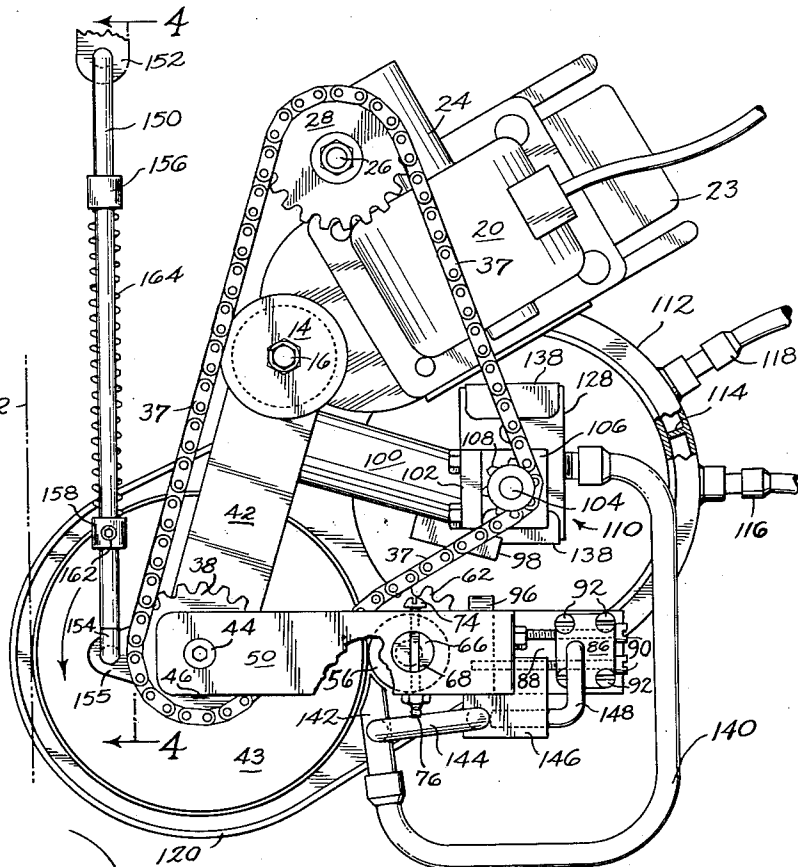


Fig. 3.

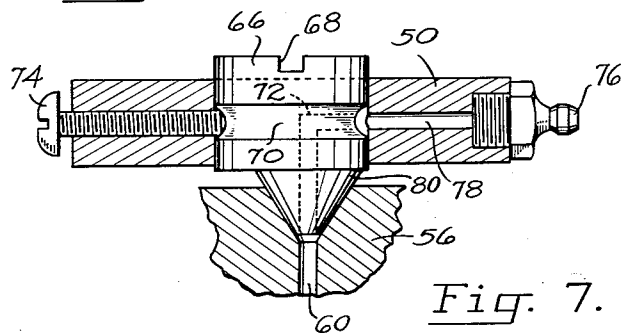


Fig. 7.

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GLUING APPARATUS

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This invention relates to gluing apparatus, particularly to apparatus for applying glue to the edges of thin sheets of veneer preliminary to uniting them edge to edge.

In one method of making composite veneer sheets to be used in the manufacture of plywood, a stack of wood veneers is passed against a cutter head which planes off the side edge of the stack until it is smooth and square. The other edge of the stack is processed likewise after which a fast setting glue is applied to at least one of the planed edges. The veneer panels next are separated and placed on differential belts which pull them together edge to edge so that the edges to which glue has been applied are abutting. The assembly then is subjected to high frequency current which sets the glue in a matter of two or three seconds.

It is the general object of the present invention to provide a glue spreader which effectively applies a fast setting glue to the edge of wood veneers or other articles to be edge united and which is characterized by the following advantages:

(1) It is provided with means for circulating the glue and cooling it so that the glue does not set up in the apparatus.

(2) It applies a uniform coating of glue to the surfaces to be glued together.

(3) Its effective action is not destroyed by the presence of wood splinters, shavings, or sawdust on the surface of the work.

(4) Uniform application of glue is assured even though wear occurs in the bearings supporting the glue applying mechanism.

(5) The apparatus may be washed quickly and easily as required to prevent the accumulation of flinty, set glue deposits, particularly when the apparatus is idle.

(6) It can be lubricated in a simple manner without fouling the glue with lubricant.

(7) The glue applying mechanism is rapidly and easily adjustable to accommodate various types of work and various classes of glues.

The manner in which the foregoing objects and advantages of the present invention are accomplished will be apparent from the accompanying specification and claims considered together with the drawings wherein like numerals of reference indicate like parts and wherein:

FIG. 1 is a view in front elevation of the herein described gluing apparatus;

FIG. 2 is a view in side elevation of the apparatus of FIG. 1;

FIG. 3 is a plan view of the apparatus of FIGS. 1 and 2;

FIG. 4 is a detail view of tensioning means employed in conjunction with the operation of the herein described apparatus, looking in the direction of line 4—4 of FIG. 3;

FIG. 5 is an exploded view of a novel gear pump employed in conjunction with the herein described gluing apparatus;

FIG. 6 is a sectional view taken along line 6—6 of FIG. 1 and illustrating the construction of a ratcheting sprocket used on the present apparatus; and

FIG. 7 is an enlarged, fragmentary view in section taken along line 7—7 of FIG. 2 and illustrating the construction of mounting and lubricating means for a doctor roll used in the present apparatus.

The edge gluing apparatus of my invention is supported pivotally on a stationary vertical post 10 stationed appro-

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priately adjacent the path of travel of the work, indicated by the broken line 12 of FIG. 3. A sleeve or hub 14 is inverted over the upper end of the post and maintained spaced vertically therefrom by adjustment screw 16 and radially therefrom by adjustment screws 18 all of which are threaded through the hub.

The apparatus is driven by a motor 20 mounted by means of wing screws 22 on a platform 23 which is rigid to hub 14. The motor casing supports a casing 24 which contains a worm gear not illustrated but driven by the motor and meshing with a gear also not illustrated but contained in housing 25. This assembly drives a shaft 26 to which is attached a ratchet sprocket indicated generally at 28.

The construction of sprocket 28 is indicated particularly in FIG. 6. The upper end of shaft 26 is formed with a notch 30. The sprocket hub is formed with a central circumferential groove 32. A dog 34 is slidably mounted in an opening in the side wall of the sprocket hub so that its forward end seats in notch 30. A spring 36 is connected to the dog, urging it continuously inwardly into the notch. Accordingly, whenever the speed of drive shaft 26 exceeds the rotational speed of ratchet sprocket 28, the shaft will drive the sprocket and the other elements of the apparatus. This has a significance to be explained hereinafter.

The various units of the assembly are driven from a chain 37 which engages sprocket 28. This chain engages another sprocket 38 keyed to a shaft 39. The latter shaft has axially therethrough a bore 40, the ends of which are outwardly flared. It is supported by a bearing 41 welded to one end of a horizontal support arm 42, the other end of which is welded to hub 14. Shaft 39 supports a large roll 43 having a knurled peripheral surface 45 which applies glue to the surface of the work. It is lubricated through a zerk fitting 54 which communicates with opening 40.

A doctor roll assembly cooperates with applicator roll 43. This assembly is supported by a pair of screws 44, the pointed ends of which enter the conically flared open ends of bore 40 in drive shaft 39. Adjustably mounted on the pointed screws by set screws 46 is a U-shaped frame 50 having an outward extension 52.

Frame 50 rotatably mounts a doctor roll 56 formed with an integral segment 58 of reduced diameter. The roll has a longitudinal opening 60 therethrough which communicates with a similar opening through a sprocket 62 keyed to the upper end of the roll. This sprocket is positioned for engagement with drive chain 37, with which it is maintained in contact by the friction of the glue present between the applicator and doctor rolls, as well as by the frictional engagement of cone-shaped screws 44 with the applicator roll.

The upper end of the doctor roll is rotatably and adjustably mounted in a manner particularly apparent from a consideration of FIG. 7. The upper leg of U-frame 50 mounts an eccentric 66 having a slotted head 68, a circumferential groove 70 and an angular passageway 72. A set screw 74 extends into groove 70, and a zerk fitting 76 communicates with a passageway 78 through the frame. This in turn communicates with passageway 72 through the eccentric.

A conical bearing 80 is mounted eccentrically on the under surface of member 66 and penetrates the outwardly flared upper end of passageway 60 through the doctor roll and shaft. Accordingly, when set screw 74 is loosened, the eccentric may be turned by means of a screw driver inserted in slot 68 to adjust the upper end of the doctor roll with respect to applicator roll 43.

The lower end of the doctor roll is rotatably and adjustably mounted by an assembly, the construction of which is particularly apparent in FIG. 2. Extension 52

of U-shaped frame 50 mounts a block 84 which supports a second block 86 fastened to a horizontally extending leaf spring 88. Pulling and bucking screws 90 work against frame 50. Set screws 92 releasably fasten together block members 84, 86.

The inner end of leaf spring 88 mounts a pointed bearing 94 which penetrates the outwardly flared end of longitudinal bore 60 through the doctor roll. Hence, this bearing as well as the companion pointed bearing 80 on the upper end of the assembly, may be lubricated effectively through zerk fitting 76. Also, the lower end of the doctor roll may be positioned accurately relative to the peripheral surface of applicator roll 43 by means of pulling and bucking screws 90.

It is to be noted particularly that the arrangement of applicator roll 43 and doctor roll 56 relative to each other is such that provision is made for accommodating any sticks, splinters, or shavings which may inadvertently be introduced between them. Heretofore, the problem presented by introduction of such material between the rolls has been such that rubber rolls have been employed. By the present invention it is possible to employ steel rolls with consequent superior application of the glue and longer life of the rolls.

This desirable result is made possible primarily by two factors. In the first place, when a foreign object passes between the rolls, spring 88 mounting the doctor roll moves downwardly, permitting the roll to shift outwardly on pointed screw 94 which supports it. This permits the foreign object to pass between the rolls without damaging them.

Secondly, the difference in diameter of the rolls is such that the ratio of their peripheral speeds is of the order of 4:1. This causes a rubbing or grating action on wood particles which may pass between the rolls, particularly in view of the knurled surface of the applicator roll. As a consequence, small particles are disintegrated so that they do not interfere with the roll action.

During rotation of applicator roll 43, frictional engagement of pointed screws 44 with the side walls of bore 40 causes frame 50 swing in a counterclockwise direction as viewed in FIG. 3, bringing the doctor roll sprocket 62 into engagement with chain 37, thereby driving the roll. To prevent damage to the apparatus during this rotation, the frame is provided with an adjustable, eccentrically mounted bumper 96 which engages another bumper 98 fastened on an adjacent frame member.

Glue is supplied to the meeting surfaces of the applicator and doctor rolls by a pump unit which also is supported by vertical post 10. Thus the pump unit is mounted on horizontal arm 100 extending laterally from arm 42 and supporting a vertical bar 102. The upper end of a drive shaft 104 is journaled in bearing 106 fixed to the upper end of the bar. A sprocket 108 is keyed to the drive shaft and meshes with drive chain 37 so that the pump drive shaft turns with the other driven elements of the apparatus.

The lower end of bar 102 supports a pump 110 which is submerged in the glue to be applied between the doctor and applicator rolls. The glue is contained in a jacketed glue pot 112, the double walls of which are spaced by means of a partition 114 so that cold water introduced through lower line 116 must circulate around the pot before leaving through upper line 118. In this manner the quick setting glue contained in the pot may be kept at a temperature at which its setting is retarded.

The pot supports a drip pan 120 which underlies applicator roll 43 and doctor roll 56 and returns any excess glue to the pot.

A specially designed gear pump preferably is employed to circulate the glue (FIG. 5). It includes a casing 122 provided with inlet 124 and dowels 126. A lid 128 provided with dowel openings 130 and with a bearing opening 132 fits over the top of the casing. A driven gear 134 attached to drive shaft 104 extends through the lid into

the casing and meshes with an idler gear 136, the stub shaft of which is received in opening 132 in the lid.

The pump is so designed that it may be rapidly assembled and dis-assembled for easy cleaning. It is held together by means of spring clips 138. These frictionally engage the lid and casing and may be slipped on and off when it is desired to assemble and dis-assemble the pump.

Pump 110 draws glue contained in pot 112 in through opening 124 and discharges it through hose 140. The latter is connected to a nozzle 142 which is mounted for vertical adjustment on a goose neck 144. The goose neck in turn is rotatably and slidably supported by a clamp 146 secured to frame 50. By manipulation of handle 148 of the clamp, it is possible to adjust nozzle 142 both laterally and vertically with respect to the applicator and doctor rolls.

Means also are supplied for maintaining the roll resiliently in the path of work 12. In the means illustrated in FIG. 4, a first bar 150 is pivotally attached to a stationary frame member 152 and slidably interconnected with a second bar 154 by means of slides 156, 158. Each slide includes a set screw 160, 162, respectively, which interlocks the respective ends of the bars. Accordingly a coil spring 164 interposed between the slides permits resilient extension and retraction of bar 154 with angular movement of the frame supporting applicator roll 43.

Operation

The operation of the presently described apparatus is as follows:

Work 12 consisting for example of a freshly edge-planed stack of wood veneers is passed along the periphery of knurled glue applicator roll 43 at a predetermined rate. As it does so, it turns the roll and accordingly drives chain 37 which meshes with sprocket 38 on the applicator roll shaft, sprocket 108 on the pump drive shaft, and ratchet sprocket 28 on shaft 26 connected to constantly running motor 20. The rate at which the chain is driven by the work is greater than the rate at which it would be driven by motor 20 operating through ratchet sprocket 28. However, passage of the work is intermittent and when it is not driving the chain, motor 20 takes up the load and keeps the members of the assembly in movement. This prevents setting of the glue.

As applicator roll 43 rotates, it moves U-shaped frame 50 counterclockwise as viewed in FIG. 3 so that sprocket 62 on doctor roll segment 58 is placed in engagement with chain 37, driving the doctor roll. At the same time, sprocket 108 on drive shaft 104 drives gear pump 110. This circulates glue from glue pot 112 through conduit 140 and nozzle 142. Accordingly a film of glue is applied to the peripheral surface of the applicator roll and is spread on the edge surface of the work contacted thereby. The excess glue drips down into pan 120 and is returned to the glue pot. During this action the applicator roll is maintained resiliently against the work by the action of the spring assembly including sliding bars 150, 154 and cooperating spring 164.

Small sticks and splinters passing between the rolls are ground up by the grating action of their surfaces. Larger sticks not thus disintegrated cause doctor roll 56 to move outwardly, the depression of spring 88 mounting its lower end through pointed screw 94 permitting such movement.

Adjustment of the space between the doctor roll and the applicator roll to the necessary critical dimension is made possible by adjusting pulling and bucking screws 90 connected to the lower end of the doctor roll and eccentric 60 connected to the upper end thereof. Efficient lubrication of the moving parts is obtained by means of zerk fittings 54, 76 and communicating channels without contamination of the glue in the pot.

Furthermore, the apparatus may be demounted for cleaning simply by unscrewing wing nuts 22 and taking off the motor, after which the entire assembly except for the glue pot may be lifted off post 10 which rotatably sup-

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ports it. The gear pump 110 itself may be dis-assembled simply by moving spring clips 138. This is of importance since apparatus of this class often must be washed out several times a day to prevent hardening of the glue on the various parts. Still further, when the apparatus is in operation, motor 20 supplies a drive which keeps pump 110 at all times pumping the glue through the system. This in turn prevents or delays setting of the catalyzed glue by exposing it continuously to the cooled surfaces of jacketed pot 112.

It is to be understood that the form of my invention herein shown and described is to be taken as a preferred example of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. Gluing apparatus comprising an applicator roll rotatably positioned for driving contact with work moving in a predetermined travel path, a rotatably mounted doctor roll positioned in working relation with the applicator roll, pump means communicating with a source of glue and positioned for applying glue to the applicator roll, drive means interconnecting the applicator roll, doctor roll and pump means for driving them in unison, motor means for driving the drive means, and slipping clutch means interconnecting the motor means and drive means and operable to drive the latter when the applicator roll is out of contact with the work.

2. The gluing apparatus of claim 1 wherein the drive means drives the doctor roll at a differential peripheral speed with respect to the applicator roll.

3. The gluing apparatus of claim 1 including axially yieldable conical bearing means for mounting one end of the doctor roll whereby to permit movement of the doctor roll outwardly with respect to the applicator roll upon inadvertent introduction of solid particles between the two rolls.

4. The gluing apparatus of claim 1 wherein the drive means comprises a chain engaging sprockets on the applicator and doctor rolls and on the pump means, and wherein the means for rotatably mounting the doctor roll includes a generally U-shaped frame spanning and frictionally engaging the ends of the applicator roll, the rotation of the applicator roll thereupon urging the doctor

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roll and the sprocket thereon into driving contact with the drive chain.

5. The gluing apparatus of claim 2 wherein the slipping clutch means comprises ratchet means.

6. The gluing apparatus of claim 1 wherein the doctor roll is provided with an axial bore flared conically outward at its ends, conical bearings engaging the conical ends of the bore and supporting the doctor roll for rotation, and lubricant inlet means communicating with the bore for lubricating the bearings.

7. The gluing apparatus of claim 1 wherein the doctor roll is provided at one of its ends with a bearing seat flared conically outward, a rotary bearing support, and a conical bearing engaging the conical seat and mounted eccentrically on the bearing support, whereby rotation of the latter effects movement of the doctor roll toward and away from the applicator roll.

8. The gluing apparatus of claim 7 wherein the rotary bearing support is provided with an annular groove and the bearing is provided with a bore communicating at one end with the bearing seat and at the other end with the groove, and lubricant inlet means communicating with the groove for lubricating the bearing.

9. Gluing apparatus comprising an applicator roll rotatably positioned for drive contact with work moving in a predetermined travel path, a rotatably mounted doctor roll positioned in working relation with the applicator roll, pump means communicating with a source of glue and positioned for applying glue to the applicator roll, a chain engaging sprockets on the applicator and doctor rolls and on the pump means, a generally U-shaped frame supporting the doctor roll and spanning and frictionally engaging the ends of the applicator roll, the rotation of the applicator roll thereupon urging the doctor roll and the sprocket thereon into driving contact with the drive chain.

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