An improved glue reclaiming system is provided for an automatic plywood layup line. A standard layup line, where glue is applied to veneer sheets and the sheets then placed together to form a multi-layered plywood panel, features the use of a plurality of round conveyor belts which collect excess glue during the gluing process and necessitate the use of a water spray shower to remove the excess glue from these belts prior to recycling of the belts. This excess glue, when removed from the belts by means of a washing, is lost to the sewer system and, as a result, becomes a pollutant therein. The glue reclaiming system of this invention features the use of flat belts and a scraper device to remove and reclaim the excess glue from the belts for reuse in another cycle.

2 Claims, 2 Drawing Figures
GLUE RECLAMING SYSTEM

BACKGROUND OF THE INVENTION

This invention relates to conveyor systems and adhesive application systems used in the formation of a multilayered structure and, more particularly, it relates to an improved glue reclaiming system which is provided for an automatic plywood layup line.

A standard layup line, where glue is applied to veneer sheets and the sheets then placed together to form a multilayered plywood panel, features the use of a plurality of round conveyor belts which convey the veneer sheets through a glue spray booth where the glue is sprayed onto the sheets from a nozzle located above the conveyor belts. Since spaces are present between the individual sheets and the individual sheets are not as wide as the full complement of conveyor belts, a considerable portion of the conveyor belts are left uncovered to directly collect glue as they pass through the spray booth. Therefore, to eliminate this excess glue collected on the conveyor belt, the belts have typically been passed through a water shower and dip tank prior to recycling. Thus, all of the excess glue which collected on the conveyor belts became lost into the sewer system by way of the water dip tank, as well as presenting a water pollution problem, since the glue utilized in forming plywood frequently contains phenolic resins, caustic, and solids. Thus, the standard plywood layup line resulted in a considerable loss of glue and increased the pollution problems in local water systems.

Thus, there has been a need for some time for an improved automatic plywood layup line which could incorporate a glue reclaiming system to eliminate the expense of loss of glue and the excessive pollution in local water systems.

SUMMARY OF THE INVENTION

It is, therefore, an object of this invention to provide an improved glue reclaiming system for a standard automatic plywood layup line. The glue reclaiming system of this invention features the use of flat conveyor belts and a unique scraper device to remove and reclaim the excess glue from the conveyor belts for reuse in another cycle. The glue reclaiming system of this invention thereby results in considerable savings through reuse of the excess glue and eliminates the pollution problems associated with prior glue application systems in plywood layup lines.

Other objects, features, and advantages of this invention will become more apparent upon reference to the following detailed description and the drawings illustrating the preferred embodiment thereof.

In the drawings:

FIG. 1 is a schematic perspective view of a plywood layup line incorporating the unique glue reclaiming system of this invention.

FIG. 2 is a side elevation view with portions broken away in section of the glue reclaiming system of this invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THIS INVENTION

Referring now to the drawings, FIG. 1 illustrates an automatic plywood layup line, indicated generally by the numeral 10. The portion of the layup line 10, at which the glue is applied to the individual veneer sheets, includes the apparatus generally indicated by the numeral 12. A feed conveyor 14, which includes a pair of rollers 16 and 18 and a conveyor belt system 20, is utilized to feed an individual sheet of veneer 22 towards the glue application apparatus 12. Similarly, a second conveyor system 24 is provided to convey the individual sheets of veneer 22 away from the glue application apparatus 12 and incorporates a pair of rollers 26 (only one shown) and a conveyor belt system 28. The glue application apparatus 12 incorporates a plurality of endless flat conveyor belts 30 which are positioned to travel around a plurality of rollers designated by the numerals 32, 34, 36, 38, and 40. These conveyor belts 30 are caused to rotate around the various rollers by drive means (not shown), which may be connected to one of the roller mechanisms to rotate it and thereby drive the belts. A glue application booth 42 is positioned above the upper surface of the conveyor belts 30, between the rollers 32 and 34, to spray adhesive, as shown by the arrows 44, onto the upper surface of the veneer sheets 22. It can easily be seen that a considerable amount of the surface of the conveyor belts 30 remains exposed to the glue spray 44 as the plywood veneer sheets 22 pass thereunder. Specifically, the upper surface of the conveyor belts 30 remain exposed to the glue spray in the areas between the individual plywood sheets and around the edges of the sheets when the sheets are narrower than the total width of the conveyor belts 30.

A water bath 46 and a water spray 48 are positioned adjacent to the roller 40 so that each of the individual conveyor belts 30 passes therethrough and is washed clean prior to being recycled into contact with the roller 32 for pickup of a new plywood sheet. In a standard plywood layup line, all of the excess glue which is deposited on the conveyor belts 30 must be removed by means of the water bath 46 and water spray 48 and, as a result, ends up as a pollutant in the local water system.

The unique glue reclaiming system of this invention is illustrated in both FIGS. 1 and 2 and indicated generally by the numeral 50. The glue reclaiming system 50 features the use of a scraper 52 which is positioned adjacent to the revolving conveyor belts 30 at a location between the rollers 34 and 36. The scraper 52 may be of any suitable material and configuration, but it has been found that a high molecular polyethylene scraper with a tapered front edge 54 in contact with the revolving belts 30 has been effective in removing virtually all of the excess glue which remains on the belts 30. The scraper 52 is mounted above a catch basin 56 which in turn is supported on a suitable platform 58. The excess glue, depicted by the numeral 60 in FIG. 2, is removed by the scraper 52 from the revolving conveyor belts 30 and falls into catch basin 56. The catch basin 56 is connected by means of a conduit 62 to a large glue reclaiming tank 64 so that the reclaimed glue 60 flows from the catch basin 56 to the glue reclaiming tank 64. The glue reclaiming tank 64 is connected by means of conduits 66 and 68 and a pump 70 to the glue application booth 42 for recycling of the reclaimed glue 60. A high-low level control mechanism 72 is provided to include two level indicators 74 and 76 within the tank 64 to sense the level of the reclaimed glue 60 therein and thereby control the pump 70.

Thus, it can be seen that with the utilization of the flat conveyor belts 30 of this invention, in place of the previously used round conveyor belts, a unique glue re-
claiming system, as indicated generally by the numeral 50, may be incorporated into an automatic plywood layup line to reclaim virtually all of the excess glue which is deposited on the conveyor belts during the application of glue to veneer sheets.

Thus, to briefly review the operation of the plywood layup line 10, it should be understood that individual plywood veneer sheets 22 are fed by means of conveyor system 14 into contact with the plurality of revolving conveyor belts 30. The individual sheets 22 are then conveyed by the plurality of flat conveyor belts 30 under a glue application booth 42 which sprays glue thereon. The individual sheets 22 then are fed onto conveyor system 24 which conveys them to a stacking mechanism (not shown) where the individual sheets are placed together to form a multi-layered plywood panel. The flat conveyor belts 30, after releasing the sheets 22 to the conveyor system 24, continue into contact with the scraper 52 which removes virtually all excess glue 60 from the belts 30 and directs it via catch basin 56 and conduit 62 to the glue reclaiming tank 64. From the glue reclaiming tank 64 the excess reclaimed glue 60 is forced by pump 70 to be recycled back to the glue applicator booth 42 for reuse on subsequent veneer sheets 22 passing thereunder. Once it has been scraped by scraper 52, the particular areas of the revolving conveyor belts 30 then passes on around rollers 36 and 38 into the water bath 46 where it is sprayed by the water shower 48. All final particles remaining on the conveyor belts 30 are then removed when contacted by the water spray 48 and the water bath 46. This portion of the conveyor belts 30, which has now been scraped and washed, passes on up into contact with the roller 32 and is ready to pick up a new veneer sheet for glue application. The use of an automatic plywood layup line incorporating the unique glue reclaiming system of this invention has resulted in virtually all of the excess glue being removed prior to the conveyor belts passing into the water bath portion, thereby resulting in considerable savings by recycling the excess glue and eliminating the pollution of the local water system by means of the discharge from the water bath.

In addition, the old style round conveyor belts utilized a metal joint to accomplish a splice so as to make each individual belt continuous. In contrast to this, the new style flat conveyor belt formed from plastic is made endless by means of a smooth molded joint. This continuous smooth surface of the new flat belt facilitates the use of the scraper system to remove and reclaim the excess glue on the conveyor belts. It has also been found that utilizing the new style belts and removing and reclaiming the excess glue therefrom results in a considerably longer life expectancy of the conveyor belts when compared with the previously used round belts. Therefore, the use of the unique glue reclaiming system and the flat conveyor belts as taught by this invention results in considerable savings both in longer life expectancy of the belts and reuse of excess reclaimed glue and eliminates the pollution problems associated with standard layup lines wherein all excess glue was removed by a water spray and bath so as to end up in the local water system.

I claim:

1. A layup line for sheet material including a glue reclaiming system, said layup line comprising, in combination:
   a. a conveyor including a plurality of endless substantially parallel flat belts revolving about a plurality of spaced apart rollers for transporting individual sheets of said sheet material from a receiving position to a discharging position;
   b. glue application means located adjacent to said conveyor between said receiving and discharging positions for applying glue to said sheets as said sheets are transported by said conveyor;
   c. glue removal means including a flat scraper member located to contact each of said plurality of revolving flat belts to remove the glue remaining on said belts after said sheets have been transported by said conveyor to said discharging position and a catch basin located adjacent to said scraper member for receiving the glue removed from said plurality of flat belts by said scraper member;
   d. glue recycling means including a glue reclaim tank, a first conduit connecting said catch basin to said reclaim tank to facilitate the movement of said reclaim glue from said catch basin to said reclaim tank, a pump means for forcing the reclaimed glue to be displaced from said glue reclaim tank to said glue application means, a second conduit connecting said glue reclaim tank to said pump means, and a third conduit for connecting said pump means to said glue application means, said glue recycling means further including a claimed glue level sensing means positioned within said glue reclaim tank and connected to said pump to sense the level of the reclaimed glue within said glue reclaim tank and control the amount of glue forced by said pump means from said glue reclaim tank to said glue application means;
   e. and a water bath and water spray chamber positioned so that said plurality of flat belts pass therethrough for cleaning after said plurality of flat belts have been scraped by said flat scraper member.

2. A layup line as set forth in claim 1 wherein said glue application means comprises a glue holding tank and a plurality of glue spray nozzles positioned above said plurality of revolving flat belts between said sheet receiving and sheet discharging positions.