United States Patent Office 2,775,170 Patented Dec. 25, 1956

2,775,170

METHOD OF CLEANING PRESS WIRES

Norris Leo Bustin and Charles T. Smith, Laurel, Miss., assignors to Masonite Corporation, Laurel, Miss., a corporation of Delaware

No Drawing. Application May 20, 1954, Serial No. 431,298

4 Claims. (Cl. 92—61)

The present invention relates to the production of fibrous lignocellulose hardboards. More particularly, the invention relates to the production of such hardboards from wet laps of felted lignocellulose wherein the laps are supported on wire screens and transported thereby into the openings of a multi-platen press and consolidated to final form. Even more particularly, the invention relates to an improved method of cleansing the wire screens employed in the hot press consolidation of lignocellulose hardboards. The invention is directed to the improved method of cleansing wire screen during hardboard production, and to the benefits derived therefrom including the improved hardboard products obtained through employment of the novel method.

In the manufacture of lignocellulose hardboard products, it is common practice to hydrolyze and refine the lignocellulose and thereafter felt the refined fiber from aqueous slurry into the form of a lap. This felted lap contains, at the time of its entrance into a press, about 30–50% of fiber and about 50–70% of water. Accordingly, the wet lap is usually supported on a wire screen and is transported thereby into the opening of the consolidating press. This method has been employed commercially for many years and is exemplified by the United States Patent No. 2,046,750 to Mason.

During the consolidation of wet laps, the felted sheets are subjected to pressures of several hundred pounds up to about 500 pounds per square inch and to press platen temperatures of the order of about 350–550° F. Water is expressed from the lap and escapes through the wire screen meshes. As the felted article is heated, steam escapes therefrom. In the pressing procedure, the water expressed contains materials soluble therein and materials suspended therein, all of them of a carbonaceous nature since they are derived from the original lignocellulose. Obviously, some of the suspended solids become occluded on the wire screen and, over a period of time, there is a considerable build-up of charred material at the lateral edges of the screen. This occluded material, when sufficiently built up, prevents easy escape of water and steam from the compressed wet lap and often results in "blow-outs" wherein the fibrous material is explosively discharged from the press. For this reason, it is necessary to change the press wire screens quite frequently and to clean them before restoring them to use. This procedure, in large commercial operations, involves many man hours of labor and a resulting undesirably large expense.

Ordinarily, screens removed from the presses are immersed for several hours in an aqueous solution of an alkaline detergent composition. Thereafter, the screens are rinsed with water and are suitable for re-use although it is frequently necessary to brush the wire to remove all of the occluded charred material. The above procedure has represented a serious problem in the manufacture of hardboard articles. It has necessitated employment of a relatively large labor force to change the press wire screens, clean them, replace them, and to prepare new wire screens.

It has now been discovered that the press wire screens can be cleansed while in operation. A dilute aqueous alkaline detergent is applied to the edges of the fibrous wet lap prior to its admission into the press openings. Upon application of heat and pressure to the screen-supported wet lap, water and then steam is expressed therefrom and flows out of the press openings with a substantial amount thereof passing through the meshes of the screens. The combined action of the alkaline detergent at the wet lap edges, together with the water and steam expressed from the lap, cleanses the screens and keeps them free from occluded material. In this manner, the working life of the screens is more than doubled, and the man hours of labor involved in their fabrication, installation, removal, and cleaning is reduced many fold.

In carrying out the novel method of the invention, dilute aqueous alkaline detergent material is flowed onto the wet lap edges as the sheet material moves along the forming machine. The solution is directed against the lap edges by suitable means as, for example, by nozzles connected to a supply of the detergent solution by pipe or hose. Inasmuch as the wet lap contains from about 50–70% of water, the detergent solution penetrates only a short distance thereinto. Usually, penetration of the solution will be less than ¼ inch although, obviously, where the lap contains less water the penetration of the solution may be somewhat greater.

It has been found that any of the commercially available metal cleansing detergents may be satisfactorily employed in the novel process. Ordinarily such compositions contain surfactants such as salts of fatty acids, rosin acids, and certain synthetic organic materials. Also, there is usually present one or more alkaline cleaners such as sodium hydroxide, sodium orthosilicate, trisodium phosphate, sodium carbonate, sodium tetraborate, tetrasodium pyrophosphate, and/or sodium polyphosphates. In addition, it is common practice to include a synthetic surface active agent to enhance the surface activity of the cleaner. In the present method it is preferred to use a detergent composition which is a blend of alkaline salts and resin soap together with a small amount of a surface active agent.

In preparing the aqueous solution of alkaline detergent, a relatively wide range of concentrations is permissible depending on the particular compound employed. However, it is ordinarily preferred to prepare a solution of about 2–5% concentration for the most satisfactory wire cleaning results. Following is a table showing the greatly increased production of hardboard obtained by following the novel method of the invention. The aqueous detergent solution was approximately a 3% concentration of a commercial detergent as described above; 30 pounds of Oakite #24 was dissolved in 55 gallons of water. The hardboard production increase is set forth in terms of the average square feet of board produced per square foot of screen wire before it was necessary replace the screen.

Table 1

Press Units	Old Method	New Method
1	128	259
2	164	286
3	217	564

The addition of the detergent solution to the wet lap edges may be carried on continuously, or it may be intermittent where continual cleansing of the press screen wires is not necessary. This, of course, is dependent on the particular lignocellulose furnish being employed. In any event, during the heating and compressing of the wet laps in the press openings, water and steam are emitted

under considerable pressure. The combined action of detergent, water, and steam serves to maintain the press wire screens in clean condition free from occluded charred matter. As seen in the foregoing table, the result is increased production of hardboard products and increased press wire screen life.

From the foregoing it will be appreciated that the novel wire screen cleaning process provides several outstanding advantages over previously employed methods. It eliminates the necessity for frequent removal of the screens for cleaning, and greatly extends the life of the wire screens. Additionally, it prevents blow-outs of the fiber from the press. Altogether, the novel method results in the saving of considerable labor and expense in press operation and provides a decided advance in hardboard production.

We claim:

1. In the production of lignocellulose hardboard wherein a felted lap of hydrolyzed lignocellulose fiber containing about 30–50% fiber and 75–50% water is charged into a heated platen press on a supporting wire screen, the improvement which comprises wetting the lateral edges of said lap with an aqueous solution containing about 2–5% of alkaline detergent prior to entrance thereof into the press, followed by admission of the screen-supported lap into the press opening and application of platen pressure and heat to the wet lap, whereby water and steam are expressed under pressure through the screen thereby cleansing said screen of occluded carbonaceous material and extending the operating life of said screen.

2. An improved method of cleansing wire screen employed in the production of lignocellulose hardboard wherein said wire screen serves to support and transport a wet lap of hydrolyzed lignocellulose into a heated press opening, which comprises wetting the lateral edges of said lap with an aqueous solution containing about 2–5% of alkaline detergent prior to admission thereof into the press opening, thereafter traveling the screen-supported lap into the press opening, closing the press opening and subjecting the wet lap to heat and pressure and thereby causing hot water and steam under pressure to be expressed through the screen whereby occluded carbonaceous material is removed from said screen.

3. In the production of lignocellulose hardboard wherein felted laps of hydrolyzed lignocellulose containing about 30–50% fiber and 70–50% water are charged into a heated multi-platen press on supporting wire screens, the improvement which comprises applying to the lateral edges of the wet laps a dilute aqueous solution containing about 2–5% of alkaline detergent prior to entrance thereof into the press, followed by admission of the screens and laps thereon into the press openings and application of platen pressure and heat to the laps, whereby water and then steam are expressed under pressure through the screen thereby cleansing said screen of occluded carbonaceous material and extending the operating life of said screen.

4. An improved method of cleansing wire screen employed in the production of lignocellulose hardboard wherein said wire screen serves to support and transport wet laps of hydrolyzed lignocellulose into the openings of a heated multi-platen press, which comprises applying to the lateral edges of the wet laps an aqueous solution containing about 2–5% of an alkaline detergent prior to the entrance of the screens and laps into the press, thereafter traveling the screens and laps thereon into the press openings, closing the press openings and subjecting the wet laps to heat and pressure and thereby causing hot water and steam under pressure to be expressed through the screens whereby occluded carbonaceous material is removed from said screens.

References Cited in the file of this patent

UNITED STATES PATENTS

267,704	Manning	Nov. 21, 1882
1,881,418	Lathrop et al.	Oct. 4, 1932
2,046,750	Mason	July 7, 1936
2,215,246	Gill	Sept. 17, 1940
2,414,251	Wilson	Jan. 14, 1947
2,498,149	Bower	Feb. 21, 1950
2,673,520	Bainbridge	Mar. 30, 1954
2,680,995	Frost et al.	June 15, 1954

FOREIGN PATENTS

471,402	Great Britain	Sept. 3, 1937

OTHER REFERENCES

Ziegler et al., abstract, 664,668, Nov. 21, 1950.

Rubber Age, January 1947, page 485. (Copy in Scientific Library.)