PROCESS FOR FORMING A FLUFFED FLUFFY PULP BATT

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1 2 Claims

ABSTRACT OF THE DISCLOSURE

A process for forming a fluffy fibrous pulp batt for use in sanitary products wherein the fluffy fibrous pulp batt has markedly improved strength and integrity with longer, stronger and more uniform fibers for producing greater loft, moisture absorption and strength in the batt.

The process includes the continuous steps of treating the wet pulp to effect kinking and interlocking of the fibers, forming the fibers into a wet pressed pulp sheet, drying, mechanically fiberizing the sheet and air-laying the depoled kinked fibers to form a fluffy pulp batt with improved strength and integrity due to the kinked and interlocked fiber formation. Preferably, the process also includes the steps of producing a dilute, aqueous slurry of the kinked and interlocked fibers and incorporating in the slurry a cationic debonding agent, so that minimum breakage of the fibers will result during the mechanical fiberizing step due to the debonding effect of the cationic nature and a fluffy pulp batt will be produced with minimum fiber breakage therein.

This invention relates to a process for improving a fluffy fibrous pulp batt adapted for use in sanitary products or the like wherein the fluffy fibrous pulp batt has markedly improved strength and integrity with longer, stronger and more uniform fibers for producing greater loft, moisture absorption and strength in the batt.

In sanitary products, such as sanitary napkins, diapers, etc., fluffy fibrous pulp batts have been utilized as the core material for providing absorbency and other characteristics in the sanitary products. These fluffy fibrous pulp batts are normally produced by manufacturing a wet pulp sheet formed by wet pulp and paper making processes and then mechanically fiberizing the wet pressed pulp sheet into individual fibers and air-laying the individual fibers to form a fluffy fibrous pulp batt which may be cut and placed into the center or core of the sanitary products.

In such fluffy fibrous pulp batts, the fluffy fibrous pulp batt must have the properties of strength and integrity inasmuch as the batt is utilized as the core or center of the sanitary products and must therefore provide strength and integrity to the overall sanitary products. Also, it is desirable to have minimum fiber breakage from the mechanical fiberizing operation so that the ultimate air-laid fluffy fibrous pulp batt will provide improved moisture absorption characteristics. Also, it is desirable for the wet pressed pulp sheet to be substantially completely fiberized to eliminate undesirable residual un-fiberized sheet particles and minimize fiber dust so as to provide longer, stronger and more uniform fibers for producing greater loft and strength in the batt.

Accordingly, it is the object of this invention to provide a process for improving a fluffy fibrous pulp batt adapted for use in sanitary products or the like wherein the fluffy fibrous pulp batt has markedly improved strength and integrity with longer, stronger and more uniform fibers for producing greater loft, moisture absorption and strength in the batt.

It has been found by this invention that the above object may be accomplished by providing a process comprising the continuous steps of treating wet pulp fibers for effecting kinking and interlocking of the fibers, forming the fibers into a wet pressed pulp sheet, drying, mechanically fiberizing the sheet and air-laying the depoled kinked fibers to form a fluffy pulp batt with improved strength and integrity due to the kinked and interlocked fiber formation. Preferably, the process also includes the steps of producing a dilute, aqueous slurry of the kinked and interlocked fibers and incorporating in the slurry a cationic debonding agent, so that minimum breakage of the fibers will result during the mechanical fiberizing step due to the debonding effect of the cationic nature and a fluffy pulp batt will be produced with minimum fiber breakage therein.

By any conventional pulp making and paper making technique, the fibers produced are essentially non-kinked. That is, they exist as straight fibers and are going through cooking and bleaching process, are delivered to the paper making machine in essentially an uninked form. Then, when they are formed into a sheet and dried, they are held in place by the structure of the sheet and essentially remain uninked fibers in the dry sheet. Then, as in the case of fiberizing pulp, the fibers broken apart by mechanical means, the individual fibers obtained are still essentially uninked. The air-laid batt formed of these fibers has relatively little strength and integrity. There is no bonding between dry fibers once separated and brought back into contact with one another and any type of stresses put on the batt, such as handling, or pulling, easily slides the fibers by another resulting in breakage of the pad structure and the sanitary product utilizing the batt.

Referring now to the specific steps of the process of this invention, the present invention is applicable to practically all conventional types of pulp made in conventional manner by well-known kraft, soda, sulfite or neutral sulfite processes. The raw material, that is the fibers to be pulped, and otherwise processed in accordance with this invention, may be any one or more of the varieties of cellulosic materials commercially used in paper and paperboard manufacture. Illustrative examples are wood, cotton, flax, hemp, ramie, bagasse, esparto fiber pulp, etc. Generally speaking, it is desirable to use relatively long fiber material for ultimate individual fiber strength and for high resistance to breaking, powdering or dusting when subjected to fiberizing treatment.

Wet pulp fibers, of the above type, are treated for effecting kinking and interlocking of the fibers. This treating step for effecting kinking and interlocking of the fibers may be effected by the use of a mechanical kinking device, such as described in Hill et al. U.S. Pat. 2,516,384, issued July 25, 1950. The device of this patent is one example of a suitable device for treating wet pulp fibers for effecting kinking and interlocking of the fibers and any device that mechanically kinks wet fibers may be utilized in the context of this invention. In order to effecting kink wet fibers, they should be dewatered to some extent and the kinking operation may include a separate dewatering step such as a screw press, or apparatus may be used that both dewatering and works the fibers into kinks with one operation. Such a combination is described in a "Curlator" machine and is described in the section entitled "The Curlator," pages 258–261, Pulp and Paper Manufacture, volume 2, 1st Edition, 2nd Impression published by McGraw-Hill Book Company, Inc. in 1951.

Next, a dilute, aqueous slurry of kinked and interlocked fibers is produced, a cationic debonding agent is incorporated into the slurry and the slurry is formed into a wet pressed pulp sheet and dried.

Suitable cationic debonding agents are disclosed in Harvey and George U.S. Pat. Re. 26,939, issued Aug. 18, 1970; 3,554,862, issued Jan. 12, 1971; and 3,554,863,
3,809,604

In the specification there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

What is claimed is:

1. A process for forming a fluffed fibrous pulp batt for use in sanitary products, said process comprising the continuous steps of mechanically treating of web pulp fibers for effecting kinking and interlocking of the fibers, producing a dilute, aqueous slurry of the kinked and interlocked fibers, incorporating in the slurry a cationic debonding agent, forming the wet slurry into a wet pressed pulp sheet, drying the sheet, mechanically fiberizing said sheet, and air-laying the debonded kinked fibers to form fluffed pulp batt with minimum fiber breakage and substantially improved strength and integrity due to the kinked and interlocked fiber formation.

2. A process for forming a fluffed fibrous pulp batt for use in sanitary products, said process comprising the continuous steps of mechanically treating of web pulp fibers for effecting kinking and interlocking of the fibers, forming the kinked fibers into a wet pressed pulp sheet, drying the sheet, mechanically fiberizing the sheet, and air-laying the fiberized kinked fibers to form a fluffed pulp batt with substantially improved strength and integrity due to the kinked and interlocked fiber formation.

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A. L. CORBIN, Assistant Examiner

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128—284; 162—158
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,809,604 Dated May 7, 1974

Inventor(s) Phillip Waite Estes

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 17, after "includes" delete --includes--

Column 1, line 56, change "ultime" to --ultimate--

Column 2, line 55, change "effecting" to --effectively--

Column 4, line 8, change "web" to --wet--

Column 4, line 10, change "interlocker" to --interlocked--

Signed and sealed this 10th day of September 1974.

(SEAL)

Attest:

McCOY M. GIBSON, JR. C. MARSHALL DANN
Attesting Officer Commissioner of Patents