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METHOD OF DISINTEGRATING SPLIT LEATHER OR LEATHER SCRAP

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ABSTRACT OF THE DISCLOSURE

A method of disintegrating leather comprising the steps of dipping a leather raw material into warm water containing a non-ionic active agent, rotating the treated leather, dipping the leather again into warm water, and detaining the leather. The treated leather is rotated in a dilute alkaline solution and then washed. The leather is then treated in a urea solution and washed, and then dehydrated partially. Sulfonated olive oil emulsion is added to the treated leather, and the leather is then beaten and pressed against a card clothing roll for disintegration.

The present invention relates to a method for disintegrating a raw material of discarded leather goods having poor fabrication characteristics, and obtaining collagen fibers.

For split leather, various types of leather, such as suede, belore, back-skin, etc. have been widely applied. However, the grade of density and the thickness of the collagen fibers are different depending upon the leather area. Consequently, larger quantities of defective skins are also produced. It is one object of the present invention to provide a raw material for producing woven or non-woven leather goods by effectively utilizing the collagen fibers in defective leather scrap. The woven or non-woven leather goods fabricated by the fibers always retain superior characteristics, compared to other fibrous goods, especially synthetic fibers, in moisture absorbtion, heat maintenance, and dyeing affinity. Accordingly, the applicable range of leather goods is remarkably extended when utilized for such uses as wall materials, various kinds of sheets and clothing materials, and furthermore, unique products may be obtained by fitting leather pile made of fine cuts of collagen fibers to the surface of the material, such as, for example, paper, cloth, wood, leather, metal, etc., with an electrostatic flocking process.

Previously, attempts have been made to prepare the collagen fibers from leather goods by a hydrazin chemical treatment; however, difficulties have been encountered in attempting to obtain a simple fabricating procedure. Additionally, more apparent defects appear with the previous method which inconveniently represent a deterioration of quality.

It is an object of the present invention to provide a process of utilizing defective leather scrap effectively for fabricating woven or non-woven leather goods by retaining collagen fibers from the defective leather scrap.

It is another object of the present invention to provide a method for obtaining extremely long but very thin collagen fibers from the raw material leather.

It is still another object of the present invention to provide a method for chemically obtaining the collagen fibers without sacrificing any advantageous characteristics of the leather materials.

With the above and other objects in view which will become apparent in the following detailed description, the present invention will be clearly understood.

In the first processing step, a leather raw material is

dipped into warm water at about 50–60° C. containing a non-ionic active agent and subjected to rotation in a drum for about 30 to 60 minutes to make the leather softer. After this step, the soft leather is again, dipped into warm water to eliminate the salt and dissolving substances.

At this stage, a detanning treatment is necessary in order to leave a suitable amount of tanning agent, or chrome complex salt, for maintaining the thermal contraction of the collagen excessively at 80° C. or more, is because adherances or combinations derived from the surplus application of the tanning agent, or chrome complex salt, may destroy fiber structure, especially, the sense of touch.

In the case of chrome tanning, the thermal contraction temperature will be maintained by combining about 2 to 3% chrome oxide (Cr_2O_3) against the collagen.

For the dechrome agent, a dilute solution is used consisting of for example organic acid such as oxalic acid, tartaric acid and citric acid.

In the case of vegetable tanned leather, a detanning treatment with 35 tanning degrees is achieved by dipping into a dilute solution consisting of dilute caustic soda, acetone or methanol.

The leather which has finished the detanning treatment is then dipped into an alkaline dilute solution of caustic soda, sodium carbonate or sodium bicarbonate after washing in water.

The desirable alkaline degree in the above case is similar to sodium bicarbonate by observing the thermal contraction temperature, the swelling degree and the acidity of sulfuric acid. If the length and thickness of the fiber were the final proposal, we found that barium hydroxide brings the best result.

The dipping temperature and pH degree of the chromed leather in the above case were respectively 40–45° C. and pH 5.2–6.4 forming a layer having a uniform neutralization.

The leather which finished the above alkaline treatment is retreated by dipping same into a 0.1% urea solution at a normal temperature. This urea treatment prompts the deaggregation of the collagen fibers as hydrogen bounds appearing in the collagen fibers which are remarkably destroyed. In this connection, the proposed thin and long fibers can be obtained by loosening the structure of the fibers.

In the second stage, in order to process the heating treatment, an emulsion treatment of the sulfonated oil of about 1 percent by weight compared with the raw material is performed and desiccated until the water content is 35–50%.

This conditioning process is one of the most important steps for protecting fibers from shortening in the subsequent beating treatment. Also, the amount and kind of the sulfonated oil additive may, however, be selectively employed, depending upon desired fibers. It is preferred to use the higher sulfuric degrees, such as, olive oil, neat foot oil, etc.

The aforesaid water content of 35–50% is the predetermined range for the case of the staking operation which loosens the structure of the fibers, so that the disaggregation of the fibers can progress satisfactorily.

The processed fibers are beaten in this step, and thereafter the proposed collagen fibers are thereby obtained by affixation to a rotating wooden roll on which is provided a card clothing.

Example 1

7.0 kgs. of chrome split leather was dipped into warm water at 50° C. in which a 1% non-ion active agent by weight of treating substance was added, and the leather was left therein for 5 hours

Then the material treated by the aforesaid process was well softened by rotation in a drum for 1 hour.

The chrome split leather was dipped into warm water at 50° C. for 2 hours to eliminate salt and any other useless ingredients. Then 0.1% oxalic acid solution by the weight of the chromed leather was added into the drum and rotated for 30 minutes.

After a chrome containing quantity was prepared in an amount of 2 to 2.5% as chrome oxide so as to wash in water for 20 minutes, the leather treated by the dechrome process was rotated in a 0.2% equivalent solution of sodium bicarbonate heated to 40° C. for about an hour. After the pH was arranged in the range of 5.2 to 6.4, the leather was carefully washed, and rewashed again after another rotating treatment in the equivalent amount of 0.1% urea solution for an hour.

Further, the leather goods can be treated by 2 percent by weight sulfonated olive oil emulsion of the treating substance.

The material is then dehydrated by a centrifuge until the water content is 40%.

The partially dried substance is then beaten for 30 minutes in the stamp-mill.

The treated substance is next tightly wound around the wooden roll surface (10 inch width x 6 inch diameter) on which card clothing the substance is rotated at 1,300 r.p.m., whereby 3.0 kgs. by weight of the proposed collagen fibers having 0.05 mm. (thickness), and 40–60 mm. (length) were successfully obtained.

What I claim is:

1. A method of disintegrating leather, comprising the steps of

dipping a leather raw material into warm water at approximately 50 to 60° C. containing a non-ionic active agent,

rotating the treated leather in a drum for approximately 30 to 60 minutes,

dipping the treated leather again into warm water at about 50° C. for about 2 hours,

detanning the treated leather so as to prepare chrome oxide (Cr_2O_3) in the amount of about 2 to 3% by weight of the treated leather,

rotating the treated leather in a dilute alkaline solution at about 40 to 45° C. for about an hour,

washing the treated leather,

rotating the treated leather in 0.1% urea solution for about an hour,

rewashing the treated leather,

adding 2% by weight of sulfonated olive oil emulsion to the treated leather,

dehydrating the treated leather until the water content thereof is about 35 to 50%

beating the partially dried treated leather for about 30 minutes, and

pressing the treated leather against a roll on which is provided a card clothing so as to disintegrate the leather.

2. The method, as set forth in claim **1**, wherein

said detanning is carried out by dipping the treated leather into a dilute solution selected from the group consisting of oxalic acid, tartaric acid and citric acid.

3. The method, as set forth in claim **1**, wherein

said detanning is carried out by dipping the treated leather into an organic solution selected from the group consisting of caustic soda, acetone and methanol.

4. The method, as set forth in claim **1**, wherein

the dilute alkaline solution is selected from the group consisting of caustic soda, sodium carbonate, sodium bicarbonate and barium hydroxide.

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