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PROCESS FOR RENDERING FIBERS OR THREADS FROM ANIMAL COLLAGEN IRONPROOF

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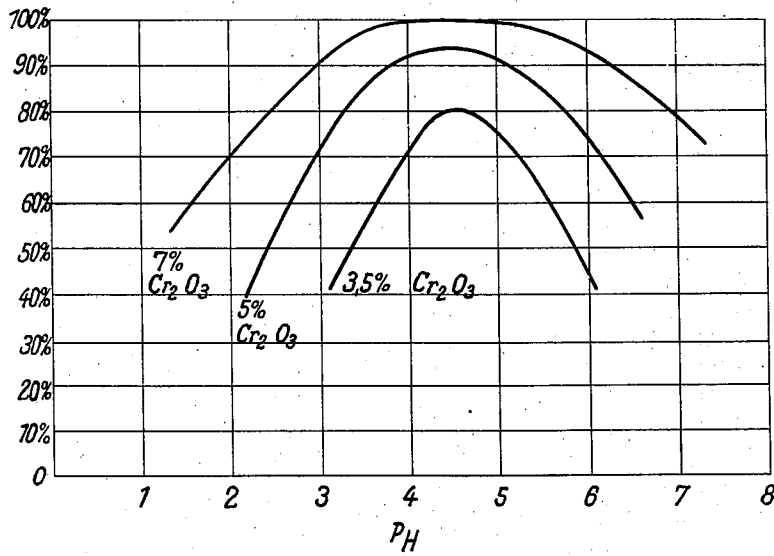


Fig. 1

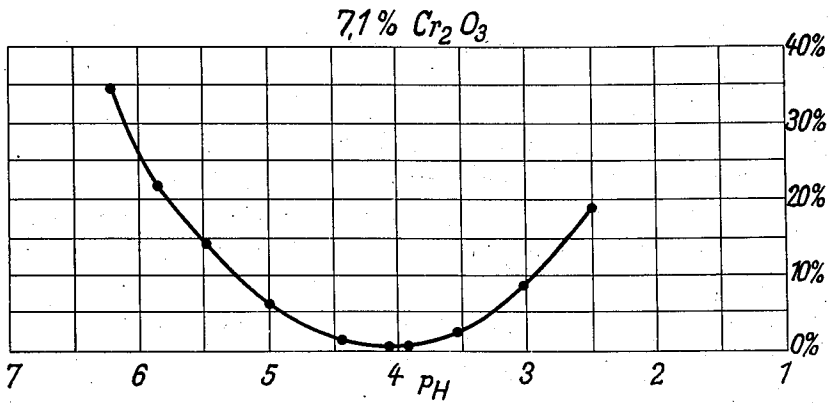


Fig. 2

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PROCESS FOR RENDERING FIBERS OR THREADS FROM ANIMAL COLLAGEN IRONPROOF

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7 Claims. (Cl. 18—54)

The present invention relates to a process for rendering fibers or threads produced in known manner from animal hides or sinews, ironproof. By the expression "ironproof" is to be understood rendering the fibers substantially proof to shrinkage and preventing weakness following a damp ironing treatment with irons, heated rollers and the like, a property which is required of every high quality textile fiber.

It has already been proposed to produce textile fibers from animal hide material such as hides, hide parts, sinews and the like. Processes for the production of natural fibers or for the manufacture of artificial fibers from animal hide material have been described in various prior applications (Serial Numbers 751,112, 19,751, 31,284 and 39,864) which have been assigned to the applicant's assignee. All of these fibers possessed the great disadvantage that they were not ironproof, that is when ironed damp they shrunk and the fibers were damaged. This disadvantage rendered the use of these fibers difficult for textile purposes for which in most cases fastness to boiling and ironing is required.

It has now been ascertained that fibers or threads from hide or sinewous collagens can be made ironproof if the fibers or threads are subjected to the well-known chrome tanning in such conditions that at least 4%, preferably 7% of oxide of chromium is fixed on to the thread, and the tanned threads or fibers are adjusted according to the content of fixed metal oxide, to fixed hydrogen ion concentrations with pH values of 3 to 6, preferably to a hydrogen ion concentration with pH value of 4.

It has been ascertained by experiment that a content of at least 4% of oxide of chromium, which is fixed to the fibers, is necessary in order that the fibers or threads are rendered ironproof. In addition there is a further condition that must be satisfied in order to render the threads or fibers ironproof. At the termination of the tanning process, or later for example after storage, the tanned fibers must be adjusted to a fixed hydrogen ion concentration between pH 3 and 6 by means of suitable chemicals. According to the quantity of oxide of chromium fixed on the fiber there is a definite point or range for the hydrogen ion concentration which results in the maximum ironproofness of the fibers. This range, in which minimum shrinkage of the threads takes place when ironed, extends in measure as the oxide of chromium content increases. For example with an oxide of chromium content of the threads of 5% the optimum iron-

proofness lies in the pH range between 4.5 and 5.5, while with an oxide of chromium content of 7% it lies between pH=4 and pH=6. Thus the absolute highest values for the resistance to deformation of shape (the reciprocal values of the shrinking values) are the more favourable the higher the content is of metal oxide. Thus with an oxide of chromium content of 7% the resistance to deformation of shape reaches the value of practically 100% (corresponding to the shrinking value of practically 0%). The relationship between the content of oxide of chromium, pH value of the threads, and their resistance to deformation of shape, can be seen in Figures 1 and 2.

Figure 1 shows a diagrammatic representation of the relationship between the ironproofness to the hydrogen ion concentration with various oxide of chromium contents.

Figure 2 graphically shows an exact reproduction of experimental results which were obtained by changing the hydrogen ion concentration with a constant oxide of chromium content of the thread of 7.1%.

As starting material for the process according to the present invention the most various kinds of fibers or threads which are obtained from animal collagen-containing material, can be used. For example natural hide fibers, which have been obtained from hides, sinews or the like by decomposition with chemicals or by heat treatment and subsequent comminution, can be rendered ironproof. Artificial threads or fibers, which have been produced from animal hides or chemical or partly hydrolytic decomposition and transformation into a mash or paste-like condition and pressed through nozzles, can also be used for the present process. These fibers or threads are subjected in known manner to a tanning process. After tanning the threads or fibers are adjusted to the suitable ironproofing pH value by treatment with suitable chemicals, alkalies or alkaline reacting alkali salts such as sodium bicarbonate, borax, soap solution and the like, and worked up in the usual way.

Combined tanning, for example with chromium and synthetic organic tanning agent, for example those sold under the protected name "Tannigangerbstoffen", can be utilized also. By this process organic compounds as well as chromium compounds are fixed onto the fibers.

The adjustment to a fixed pH value can also take place with agents which in addition to the neutralization action, improve the flexibility and ease with which the fibers can be wetted. Suit-

able agents are for example soap or alkali salts of sulpho-acids.

It has already been proposed to adjust fibrous material, which has been produced by the comminution and milling of swollen hides, to fixed pH values between 2.5 and 3.5. This adjustment requires the conversion of the fibers into a strongly swollen condition. In contradistinction hereto when hide fibers are tanned, shrinking takes place and according to the invention tanned i. e. shrunk fibers are adjusted to fixed pH values in relation to the amount of fixed oxide of chromium content.

Examples

1. Collagenous fibers, which have been produced from split strips of neat's hide by basic or acid swelling and subsequent mechanical comminution, are tanned in known manner after a pickling to a Cr_2O_3 content of 7%. The fibrous mass obtained is separated from the surplus chrome liquor, washed, pressed and the acid which is still clinging thereto is neutralized as far as possible with sodium bicarbonate, so that finally it shows a pH value of 4. The product when ironed damp has a shrinkage of 3%, while a fibrous product treated in the same way but adjusted to a pH value of 6 had a shrinkage of 15-20% on ironing.
2. Neat's split strips, after liming for two months, are washed with water, subjected to a 20 to 24 hours' swelling with dilute hydrochloric acid, then if required following a comminution, converted to a paste-like mass in presses and kneading machines. The paste is pressed through thread-forming nozzles, the formed thread is solidified in a pickle bath and finally subjected to a tanning process, in which it is brought to an oxide of chromium content of 12%. Following a washing the threads are desoured with a borax solution until they have a pH value of 5. The threads are ironproof and suitable for weaving and various purposes for example as replacement for horsehair. A comparative experiment with threads containing 12% Cr_2O_3 in which the pH value was adjusted to 7, produced a strongly shrinking product in spite of the high chromium content when ironed and boiled.
3. Threads which were produced from neat's flesh by means of chemical decomposition and subsequent mechanical comminution are subjected in

known manner to a tanning process in which 6.5% Cr_2O_3 is fixed to the threads. The tanned fibrous mass is separated from the superfluous chrome liquor, washed, pressed and adjusted to a pH value of 4.5 by treatment with sodium bi-carbonate. The product can be ironed damp without shrinking or being damaged.

4. Neat's sinews are squeezed sideways through fluted rollers in an air dried condition (15% of water) and comminuted in a mill and then cut into fibrous bundles or individual threads by means of tearing machines. The fibers are introduced into a pickle bath and then subjected to a chrome tanning process until the chromium content of the fibers is 7%. After separating the chrome liquor the threads are introduced into a further bath and adjusted to a pH value of 4 by means of sodium bi-carbonate. The resulting fibers showed a shrinkage of only 3% on ironing.

What I claim is:

1. A process for rendering fibers or threads from animal collagen ironproof comprising tanning the fibers or threads with chromium compounds sufficiently to fix at least 4% of chromium oxide on said material, and adjusting the pH value of said tanned material to a value between 3 and 6, determined relative to the fixed content of chromium oxide.
2. Process according to claim 1, wherein 7% of oxide of chromium is fixed on to the fibers and the tanned fibers are adjusted to a pH value between 4 and 5.
3. A process according to claim 1, wherein the said material is tanned with the compounds and synthetic organic tanning agents whereby organic materials are fixed upon said material in addition to the chromium oxide fixed.
4. A process according to claim 1, wherein the pH value of the tanned material is adjusted by the addition of alkalies.
5. A process according to claim 1, wherein the pH value of the tanned material is adjusted by the addition of alkaline reacting alkali salts.
6. A process according to claim 1 wherein the pH value of the tanned material is adjusted by the addition of alkali salts of organic acids.
7. Ironproof animal collagen fibers or threads containing at least 4% of fixed chromium oxide and having a pH value between 3 and 6.

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