

ALIEN PROPERTY CUSTODIAN

MANUFACTURE OF SHAPED PRODUCTS, SUCH AS FLEXIBLE TUBES, THIN SHEETS OR THREADS, FROM ANIMAL FIBROUS STARTING MATERIALS

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The invention relates to the manufacture of shaped products, such as flexible tubes, thin sheets or threads, from animal fibrous starting materials.

It is known to convert animal fibrous starting materials into highly swollen fibrous masses, to produce shaped products of every kind by shaping these swollen masses, for example by extrusion through nozzles, and to solidify these shaped products and to impart more or less waterproof properties thereto by drying and hardening or tanning. Artificial gut, membranes or threads are produced in this manner.

Shaped products as aforesaid may for example be produced according to the processes of the Applicants British Patents Nos. 429,039, 429,040 and 433,245 by converting animal fibrous starting materials by the action of swelling chemicals and, if necessary, a mechanical shredding treatment into fibrous hide pastes containing large proportions of swelling water and shaping the said pastes by extrusion through nozzles or pressing between rollers. The resulting shaped products are dried and thereafter rendered waterproof in a suitable manner. According to these processes fibrous masses are worked up which contain for example 75 to 90% and more of water, but are still of such consistency that products shaped thereof are capable of maintaining their shape unsupported. Shaped products can be formed therefore of such fibrous masses by mere extrusion in a dry spinning process or other dry shaping processes.

Highly swollen masses, which contain so much water that they do not retain their shape unsupported, however, cannot be shaped by a dry spinning process. In effect such masses, when being shaped, for example by extrusion through nozzles, would pass the nozzle without maintaining the shape given to them. The present invention relates especially to an improvement in the process of producing shaped products from such highly swollen masses.

According to this invention it has been found that shaped products may be obtained by treating highly swollen fibrous masses, especially masses containing water in such large quantities that shaped masses thereof are incapable of maintaining their shape unsupported by imparting shape to such highly swollen masses and immediately thereafter treating such shaped masses with aqueous deswelling solutions to solidify the shaped masses and only then drying the shaped solidified masses obtained thereby and rendering them waterproof by tanning or hard-

ening. Such masses are shaped according to the invention by the combination of a mechanical shaping, for example by extrusion, and the immediate introduction into deswelling liquids. The present process is a true wet spinning process.

The process of this invention is carried out by subjecting animal starting materials, such as hide, hide waste, sinews, flesh, muscular tissue, leather and the like, to a swelling treatment supplemented by mechanical treatments, care being taken to ensure that fibrous masses rich in water are obtained. Aqueous solutions of bases, for example lime, soda lye or ammonia are employed as swelling agents. Preferably milk of lime and caustic soda lye are employed successively.

The mechanical treatment consists in a careful disintegration of the swollen materials, for instance in swelling these materials in such a way that the fibres are retained as far as possible in their original condition and in this way impart particular strength to the shaped products.

The highly swollen fibrous materials containing for example more than 90% of water are worked up with the aid of known tearing and grinding apparatus, as far as possible without damaging the fibres, to a fibrous mass devoid of lumps. This mass may be further homogenised in mixing or kneading apparatus, whereby considerable quantities of water may be incorporated therewith. Masses containing for example 96% of water are thus obtained. In its external properties the resulting fibrous mass in the case of a very high water content, for example 98 to 99% of water, to a large extent resembles a solution. In certain circumstances the boundaries between swelling and solution may even disappear to such an extent, that the individual fibres can no longer be recognised and the resulting mixtures can be forced through fine filters.

The fibrous masses may be further worked up as such. It is however frequently advisable in order to effect stretching or to alter the properties, to add to the animal fibrous masses fibres or threads of vegetable origin. Natural or artificial fibres of cellulose or its derivatives have proved to be particularly suitable for this purpose. Viscose may for example be with advantage added to alkaline-swollen fibrous masses.

The resulting fibre mixtures rich in water are shaped, for example by extrusion through annular, slot-shaped or perforated nozzles, or in another manner, for example by pressing between rollers, and, in contradistinction to the known processes, be treated immediately after leaving

the shaping devices with deswelling, i. e. water-removing agents.

During the shaping operation it is advisable to ensure that the fibres are disposed adjacent one another and become felted since the strength of the resulting shaped products is improved thereby.

In the production and shaping of the fibrous mixtures rich in water the decomposing effects of the swelling agents must be repressed without the swelling effects being simultaneously reduced. This may for example be effected by preventing the material from being heated to more than 22° C. by artificial cooling. The operation is with advantage carried out even at temperatures below 15° C.

The treatment with water-removing agents is effected by introducing the products discharging from the shaping devices into water-removing baths. Water-removing salt solutions, such as solutions of common salt, ammonium chloride or sodium sulfate, may be used for the aforesaid purposes. The water-removing action of these baths may be increased or accelerated by adding to the baths agents which neutralise the swelling agents. A particularly advantageous procedure is to select the composition of the water-removing bath in accordance with the swelling agents employed for the production of the fibrous masses in such a way that shaped products produced from alkaline-swollen fibrous masses are coagulated in acid baths. If, for example, swelling has been effected with lime and soda lye, hydrochloric acid or ammonium chloride is used as coagulating bath.

Finally there may be added to the water-removing fixing or coagulating baths agents which have a tanning or hardening action, for example formaldehyde and other aldehydes, distillates from cellulose-containing starting materials, such as wood smoke condensates, mineral tanning agents, for example aluminium and chromium salts, animal tanning agents such as train oil or train oil acid, vegetable or synthetic tanning agents or salts which do not remove water, such as acetates, sulfites or benzoates.

Diferent water-removing, fixing or coagulating baths may of course also be employed in succession. During this treatment the surface of the shaped products becomes more or less considerably solidified.

In general the shaped products are subjected on all sides to the action of these treatment baths. In some cases it may however be advisable only to apply the water-removing agents on one side. Thus for example in the treatment of flexible tubes, the water-removing agents may be introduced under slight pressure from the core of the shaping nozzle into the interior of the tube, whilst the outer surface of the tube is treated only with water. Flat products may be treated on one side by passing over water-removing baths. The water liberated by the action of the

water-removing agents from the highly swollen shaped products may be thereafter entirely or partially removed by mechanical treatment in suctional filters or wringers.

The final solidification of the shaped products is effected in a manner known per se by drying and hardening or tanning, it being in most cases advisable to allow the drying to precede the final tanning operation and in this way to impart the requisite strength to the shaped products. In the cases in which the deswelling solutions contain also tanning agents and/or hardening agents a special tanning or hardening after the drying may be dispensed with.

The process of this invention is attended with considerable advantages. It enables particularly fine and yet sufficiently strong products to be produced. Considerable economies in starting materials are obtained thereby. Moreover the fibrous mixtures rich in water may be shaped under considerably lower pressure. According to the process of this invention fibre mixtures rich in water, for example containing more than 90% of water, such as could not be worked up continuously and without supporting means by the applicants' earlier processes and the resulting shaped products of which did not possess sufficient resistance to enable them to be conveyed without support on discharging from the shaping device, may be continuously worked up. Finally animal starting materials may be employed according to the process of this invention which owing to their intense swelling properties could hitherto only be with difficulty worked up, such as calf leather scraps or skews.

The process of this invention may be particularly successfully applied to the manufacture of flexible tubes, which may for example be used as artificial gut or sausage skins. It enables sausage skins to be manufactured which after filling with sausage meat retain even after prolonged keeping, the smooth appearance, similar to that of sausages made from natural gut. If the gut produced according to this invention is sufficiently hardened or tanned it will completely withstand boiling. It is moreover easily cut, is impermeable to fat and water, but on smoking enables the smoke or fumigating gases to penetrate and the sausage to "breathe."

The production of the artificial sausage skins may be effected with the aid of known apparatus, with particular advantage with the aid of the apparatus described in British Patent Specification No. 433,245. In contradistinction to the process there described however the artificial sausage skin is treated immediately after discharging from the annular nozzle with water-removing fixing or coagulating solutions. It is advisable in this case to allow the gut to fall freely from the shaping device into the treatment baths and in addition to irrigate or rinse the gut internally with the treatment liquid.

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