UNITED STATES PATENT OFFICE.

PETER TURNER AND JAMES TURNER, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN PROCESSES OF MAKING STRINGS FROM INTESTINES.

Specification forming part of Letters Patent No. **221,199**, dated November 4, 1879; application filed October 1, 1878.

To all whom it may concern:

Be it known that we, PETER TURNER and JAMES TURNER, of Chicago, in the county of Cook and State of Illinois, have invented or discovered certain new and useful Improvements in the Manufacture of Strings, Round Bands, and Belts, the method and process employed being fully set forth in the following specification.

Our invention consists in a process whereby the intestines of beef-cattle may be utilized in the manufacture of strings for musical instruments, bands, belts, &c.

Previous to our invention the intestines of sheep had long been used for making the article popularly known as "cat-gut;" but only the intestines of sheep were considered fit for this purpose, and thus the manufacture has hitherto been practically limited to the locality where such sheep are raised. The inner membrane only of the intestines of sheep is used, as the other portions are unfit for the purpose. We have, however, discovered that first-class strings, belts, &c., may be made from the outer skin of the intestines of beef-cattle by selecting the proper parts and treating them in a particular manner, by which means a superior article is produced from material that has hitherto been only refuse.

In the preparation and manufacture of strings, cords, &c., fresh beef-gut is first taken and carefully washed in pure water, and thoroughly freed from all fatty substance. The gut is then split into two distinct parts in such a manner as to separate the upper half of the gut from the lower half, the lower half—that is, the part to which the net or web of fat is attached—being refused as worthless. The part of the gut retained is next (according to the fineness of the strands desired) split into two, three, four, or more strands. The outside skin is then removed from these strands. This outside skin is the material employed by us in carrying out our improvement, all the other portions of the gut being thrown away as refuse matter, for the reason that the substance other than the outside skin detracts from the strength and durability of the manufactured article, and the manufacturer would be subjected to severe losses were the parts other than the outside skin employed, from the fact that it would be often impossible to prevent putrefaction taking place during the process of preparing the material, while this outside skin made use of by us can be preserved for weeks and months by the application of common salt.

The material is next threaded, and afterward subjected to a bath of potash-water, this bath being continued and changed daily for four or five days. The material is next treated to acid baths, alternating with alkaline (carbonate of ammonia) baths, and then pure water. A certain number (according to the thickness of the strings or bands desired) of these fine strands are then taken and spun. The material is next placed in an air-tight compartment and subjected to the action of sulphur-fumes.

The compartment in which sulphuration takes place should either be made of iron or the inner surface lined with that material. Then the sulphur fumes or vapors, combining with oxygen and the iron, produce a gas possessing superior bleaching qualities, and quickens the bleaching process.

After being removed from the bleaching process the material is first dried, and then steeped in a solution of acetic acid and gelatine, then again sulphurized, dried, and finished off with gum-arabic and oil.

The material possesses certain proportions of gelatine in its natural state, but loses it during the process of preparation, and it is therefore found to be an improvement to restore a certain proportion of this during the finishing process in order to stiffen the material and increase the adhesive qualities.

The employment of acetic acid in preparing the solution of gelatine has the effect of producing a clearer solution than if hot water were used, and prevents the solution from affecting the transparency of the manufactured goods.

Having thus described our improvement, we claim—

The process herein described of manufac-

turing strings from the intestines of beef-cattle, viz: by cutting off the part to which the fat is attached, splitting the remainder into strands, then removing the inner or mucous membrane, treating the remainder alternately with alkaline and acid baths and then with water, spinning or twisting the strands into the desired form, bleaching with the fumes of burning sulphur, steeping in a solution of gelatine in acetic acid, again submitting to the fumes of sulphur, and, finally, finishing with gum-arabic and oil, substantially as described.

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Witnesses:
FRED. J. SCHROTER,
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