UNITED STATES PATENT OFFICE.

MICHAEL EMMET RYAN, OF FALL RIVER, MASSACHUSETTS.

ANIMAL FIBER FOR FELTING AND PROCESS OF PREPARING THE SAME.

970,756. Specification of Letters Patent. Patented Sept. 20, 1910.

No Drawing. Application filed January 6, 1910. Serial No. 536,667.

To all whom it may concern:

Be it known that I, MICHAEL EMMET RYAN, a citizen of the United States, residing at Fall River, county of Bristol, Commonwealth of Massachusetts, have invented certain new and useful Improvements in Animal Fibers for Felting and Processes of Preparing the Same, of which the following is a specification.

This invention relates to the production of fibers and particularly to the preparation of those fibers for felting.

In the finer grades of felt, such as is used for the production of hats, much difficulty has been experienced in securing fibers of proper strength, brilliancy and quality, and especially without an undue waste and excessive cost. Commercial fibers for felt are secured from the pelts of various animals, perhaps most commonly from the pelts of hares or rabbits. In the treatment of these commercial pelts to secure a proper felting fiber two principal difficulties arise. The first of these has to do with the varied nature of the hirsute growth of the pelt and the second involves the peculiarity of treatment necessary to make a fiber feltable or to give it the felting property. In connection with the first difficulty it is to be borne in mind that the pelts contain substantially two distinct growths, first the soft, underlying fibers which form the principal covering of the animal, and secondly what are known as the master hairs which usually extend above the fibers so as to overlie them and in some instances appear to be the principal part of the fur. The fibers and the master hairs differ greatly in construction, growth and in their value for felt. The hair fiber consists of three distinct portions, namely: a central medulla or marrow, a layer of cellular fibrous substance or cortical tissue outside of this marrow, and an outward layer or epidermis of horn tissue consisting of flattened scales. The central medulla consists of cells arranged side by side, and the intervening spaces between these cells are probably filled with air. Thus this central portion is porous in structure, so that solutions may be sucked up by capillary action therein.

The felting of the fibers heretofore suggested involves a consideration of the external construction of the fiber. The felting properties of fibers depend upon the construction of the external cuticle of the fiber which is composed of very fine overlapping scales. These scales are covered with a thin coating of a fatty nature which has to be removed before the scales are sufficiently exposed for them to have an interlocking effect with the scales of other fibers. In order to remove the external coating of fat the fibers are subjected to an active agency, either acid or alkaline which will destroy the fatty coating. Nitrate of mercury has usually been employed in this step as the mercury basis seems to be particularly efficient in producing a strong felting quality. The nitrate of mercury is, however, a powerful chemical as it necessarily must be in order to remove the fatty coating and penetrate the scaly construction of the outside of the fiber. When the fibers are cut or pulled from the felt before they are subjected to the action of the nitrate of mercury solution, the porous structure of the central medulla or marrow allows the carroting solution to be sucked up into the fiber, which results in injury to or destruction of the internal cells of the hair. This causes the fibers to lose their life and brilliancy and value. This has led to the usual practice of carroting the fibers on the skin in order to avoid the liability of fiber destruction on account of the exposure of ends which results when the fibers are cut from the skin. The practice was, therefore, to lay a pelt on a table, fur side up, and rub in a water solution of nitrate of mercury until the fibers were all properly treated. After this the fibers were removed by some mechanical process, as by the cutting of the skin in some sort of a machine, or the plucking or the pulling of the fibers by some contrivance. In order, therefore, to avoid the waste of clipping, pulling or shearing, or other mechanical operations, I have devised my present invention in which I have provided for taking care of the differences in the nature of the fibers so as to eliminate the master hair as a factor and at the same time to secure the desirable fibers in a free condition and, moreover, in a condition in which they may be safely exposed to a carroting treatment without danger of their destruction or even without risk of impairing their quality.

I have discovered that by treating a pelt, such as the usual pelt of commerce, with acid, that by a proper proportion of the acid strength and time employed it is possible to wholly dissolve the fleshy material of the

skin, to carbonize and substantially destroy the master hairs and still leave in a free and unimpaired condition the fiber desired. This is apparently accomplished through the acquisition by the solvent of certain fatty or glutinous matter from the skin. The solvent is usually an acid and I find that sulfuric acid is a very satisfactory solvent for the purpose.

In practice I prepare a solution of dilute sulfuric acid in which I immerse the skins or the portions of the skins having the fibers and master hairs thereon. In this treatment the inner or flesh side of the skin being most exposed is first attacked and the gluey or fatty substances of the skin are released. As the acid penetrates through the lower side of the skin it first reaches the roots of the master hairs which are bedded deepest. The acid, therefore, gains access to the roots of the master hairs at a comparatively early period of the treatment. By the time the acid has reached the roots of the fibers the flesh of the hide is quite thoroughly decomposed. By this time, moreover, the acid is carrying in solution a very considerable amount of fatty matter and it is, therefore, possible to so time these activities as to rescue the fiber before it has suffered any internal attack at all and before any appreciable change has taken place externally. As the flesh of the hide has been wholly destroyed and as the master hairs only appear in the solution as minute carbonized material the fibers may be readily strained out and prepared for carroting. The carroting is accomplished by soaking the fibers in a solution of nitrate of mercury. When prepared in the manner described, no unfavorable effects on the structure of the fibers is noted at all and apparently the nitrate of mercury has been unable to penetrate the interior of the fibers but merely cuts the external film and gains access to the scaly structure of the outside.

It will thus be seen that by my process I am able to secure fibers of full length and of great strength as they have been preserved against internal attack. At the same time they have been externally treated by the most approved carroting methods and are hence in satisfactory condition for felting purposes. I am enabled to use all sorts of hides, pelts, portions and scraps, and by the term skins I intend to mean any sort of fur or fiber bearing pelt.

It is obvious, of course, that various processes of carroting might be practiced upon fibers released by my method and that various modifications in the manner of treatment and agencies employed might be made, all without departing from the spirit of my invention.

What I therefore claim and desire to secure by Letters Patent is:—

1. The process of preparing animal fibers for felting which consists in attacking a fiber bearing skin with an acid solution until the master hairs are carbonized and the skin has been dissolved and in carroting the resultant fiber.

2. The process of preparing animal fibers for felting which consists in attacking the flesh side of a fiber bearing skin by soaking the skin and fiber in acid solution until the master hairs are carbonized and the skin has been dissolved, and in collecting the resultant fibers.

3. As an article of manufacture, animal fibers for felting obtained entire from skins comprising cuticle, master hairs and fibers, from which the master hairs and cuticle have been eliminated by destruction with an acid.

4. As an article of manufacture, carroted animal fibers for felting obtained entire from skins comprising cuticle, master hairs, and fibers from which the master hairs and cuticle have been eliminated by destruction with an acid.

In testimony whereof, I affix my signature in presence of two witnesses.

MICHAEL EMMET RYAN.

Witnesses:
THOMAS F. HIGGINS,
EDWARD F. HANIFY.