

# UNITED STATES PATENT OFFICE.

LOUIS GEVAERT NAERT, OF AUDENARDE, BELGIUM.

## PROCESS OF MANUFACTURING ARTIFICIAL LEATHER.

SPECIFICATION forming part of Letters Patent No. 719,787, dated February 3, 1903.

Application filed October 15, 1900. Serial No. 33,148. (No specimens.)

*To all whom it may concern:*

Be it known that I, LOUIS GEVAERT NAERT, a subject of the King of Belgium, and a resident of Audenarde, Belgium, have invented certain new and useful Improvements in Processes of Manufacturing Artificial Leather and Similar Products, of which the following is a specification.

The object of my present invention is to provide an improved process of manufacturing artificial leather and similar materials for shoes and boots, belts, coverings, gaiters, upholstery, or the like by the impregnation of dressed or felted tissue or fabric with solutions of cellulose, and more particularly with xanthate of cellulose, and by the successive impregnation with solutions of gutta-percha or india-rubber, or both, mixed or not with dammar-gum, asphalt-gum, or other gums or resins or fatty substances. These latter substances may be omitted.

The improved process is as follows:

(A) The dressed or felted tissue is preferably made of cotton and woven in single or double taffeta and twilled in any desired way in accordance with the desired appearance and thickness to be obtained. It is evident that any textile material may be substituted for cotton. The tissue may be dressed or felted on both sides, the final product being the more perfect the more the tissue is felted.

(B) *Impregnation with cellulose.*—I first prepare a xanthate of cellulose by soaking rags or cotton waste in a solution of fifteen per cent. of caustic soda. Then the solution is pressed out until the material employed only still retains three times its own weight thereof. I then add sulfid of carbon—that is, a quantity equal to forty per cent. of the weight of waste employed—the mixture being soaked in a closed vessel during several hours until the product is soluble in water, whereupon I add a sufficient quantity of water to obtain the desired concentration. I preferably employ solutions containing for one hundred liters of water three to eight kilograms of waste materials. To said solution may be added linseed-oil or castor-oil, soap, or other substances. However, these additions may be dispensed with. They are useful when it is desired to produce artificial leather without employing rubber or gutta-percha. The

impregnation is effected in a vacuum, the fabric to be converted into leather being introduced into a closed apparatus in which the vacuum is made prior to the introduction of the solution of xanthate of cellulose. Satisfactory results may also be attained without a vacuum by laying the fabric just before the immersion thereof upon a plate or drum heated by means of steam. Thus the air contained in the fabric is expanded by heat, when the fabric is introduced into the cold cellulose solution, producing an incomplete vacuum within the fabric, whereby the impregnation is facilitated. When the process is carried out without producing the vacuum, and particularly when it is desired to produce thick leather, less satisfactory results are generally obtained; but it is evident that the process without a vacuum is within the scope of my invention. The impregnated fabric is dried with or without being stretched. The fabric is preferably slightly stretched during the drying period. After perfect drying the material may be immediately washed. If the material is but partly dried, the xanthate of cellulose is decomposed by passing the material through a hot concentrated solution of sea-salt, or preferably by means of vaporization. To this end the fabric is introduced by layers into a suitable receptacle through which a current of steam is passed during some minutes. When the cellulose is fixed, the material will be washed in order to eliminate the alkaline substance. In case of thick leather the material is soaked during several hours in pure water and then dried. I obtain products of more or less varying appearance, according as the cellulose has been fixed by simple drying or by the passage through a solution of salt or by vaporization.

Although the cellulose is most advantageously employed in the form of xanthate, I wish it to be understood that any other solution of cellulose may be substituted therefor, such as cellulose dissolved in copper ammonia or in zinc chlorid.

(C) *Impregnation with a solution of rubber or gutta-percha.*—The dressed fabric, which after the application of cellulose thereto resembles leather, is then impregnated with weak solutions of gutta-percha or india-rubber, or both, dissolved in a suitable solvent,

such as sulfid of carbon or benzin. When only gutta-percha is employed, I obtain artificial leather like natural leather as to the appearance thereof. When only india-rubber is employed, I obtain a more flexible or supple material, like chamois leather, &c. However, the hardness or suppleness of the final products depends particularly on the concentration of the solutions of xanthate of cellulose employed in the first step of my process. The suppleness may be decreased by the addition of dammar-gum, asphalt-gum, or other gums to the solution of rubber or gutta-percha. When it is desired to produce different kinds of leather, I preferably combine rubber with gutta-percha. India-rubber is preferably employed in the following proportions: fifteen to twenty-five grams per liter of the dissolving agent, while I dissolve seventy-five to one hundred grams of gutta-percha per liter of dissolving agent. The addition of gums may be omitted. However, these additions modify the quality and appearance of the leather. I obtain, for instance, a fair product by adding two to ten grams of dammar, asphalt, or other gums per liter of dissolving agent. The addition of a small quantity of chlorid of sulfur is also useful, but not necessary.

For the second impregnation I employ the ingredients preferably in the following proportions: sulfid of carbon, (or benzin,) one liter; gutta-percha, twenty grams; india-rubber, twelve grams; asphalt or dammar gum, three grams.

I also obtain valuable artificial leather by only carrying out the second part of my process—that is, by omitting the impregnation with cellulose—in which case it is desirable to add a larger quantity of gum in order to obtain equal stiffness. For instance, I add five or more grams of dammar or asphalt gum instead of three grams. Perfect results are also obtained when the impregnations with rubber and gutta-percha are effected in a vacuum. However, this is not so necessary as for the first impregnation, and particularly when the material is easily impregnated.

Various devices or apparatus may be employed for producing the vacuum and effecting the impregnation. However, in order to reduce the expense of manufacture the de-

vices are preferably arranged so that the vaporized dissolving agent may be collected again.

The impregnations with cellulose and with india-rubber or gutta-percha may be repeated when it is desired to produce harder and closer material.

In order to obtain smoother, more supple, and glossy material, the same may be submitted to the action of rollers or to the finishing operations used with natural leather. Again, the material obtained may be varnished in any desired way. However, this is only necessary when it is desired to produce artificial varnished leather.

In order to give the artificial leather the desired color, the fabric may be previously colored, or the dyeing may be effected together with the first impregnation, and even coloring substances may be added to the solutions of rubber or gutta-percha.

Although I have described my improved process as being carried out by employing dressed or felted tissue or fabric, I wish it to be understood that non-dressed tissue may also be employed for the purpose of producing material for belts and the like, which need not resemble leather.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The process for the manufacture of artificial leather, consisting in forming upon the tissue serving as a base a roughened, woolly or felted surface, impregnating it with diluted solution of xanthate of cellulose, fixing said cellulose, and finally impregnating the structure with rubber or gutta-percha solution.

2. The process for the manufacture of artificial leather, consisting in forming upon the tissue serving as a base a roughened, woolly or felted surface, impregnating it in a vacuum with diluted solution of xanthate of cellulose, fixing said cellulose, and finally impregnating the structure in a vacuum with rubber or gutta-percha solution.

In testimony whereof I have hereunto set my hand in presence of two witnesses.

LOUIS GEVAERT NAERT.

Witnesses:

O. SCHON,

GREGORY PHELAN.