

UNITED STATES PATENT OFFICE.

GEORGES GAUTIER, OF PARIS, FRANCE.

MANUFACTURE OF ARTIFICIAL LEATHER.

SPECIFICATION forming part of Letters Patent No. 736,957, dated August 25, 1903.

Application filed November 23, 1901. Serial No. 83,409. (No specimens.)

To all whom it may concern:

Be it known that I, GEORGES GAUTIER, physician, of 3 Place du Théâtre Français, in the city of Paris, Republic of France, have invented new and useful Improvements in and Connected with the Manufacture of Artificial Leather, which improvements are fully set forth in the following specification.

This invention relates to a new industrial product, as well as its process of preparation. The principal feature that distinguishes this process from previous processes is that it utilizes as the principal matter for the manufacture of the new product only raw hides, preferably scraps or waste, such as the hide of the head and legs, otherwise unutilizable—that is to say, the tripes—to the exclusion of all old waste tanned leather.

To prepare this new product, I take raw hides that have not been subjected to any treatment, and, having removed the hair by any suitable means, I subject them to a prolonged liming, which has the effect of causing the hides to swell. When the hide has been subjected to the action of the lime for about twenty days, it commences to disintegrate—that is to say, the gelatinous, glutinous, or other matter which unites the fibers is softened, and thus prepared for the division of the fibers by the tearing operation, to be described hereinafter. When the liming has attained a sufficient degree, the hide is carefully washed in water in order to remove all traces of lime, the presence of which would be unsuitable for the employment of sulfates. The final effect of the extra liming is to give to the new product great solidity. The hide thus prepared is cut into small pieces in the form of narrow strips and the strips subjected to a disintegrating operation for the purpose of separating the fibers one from another in such a manner that the fibers are not broken, but are preserved intact throughout their entire length. The fibers are thus brought to a skein-like formation in admixture with the other ingredients of the skin, which are in a paste-like condition. This result is obtained by the employment of a separator or disintegrator, the surface of which is covered with teeth or projections which separate the fibers without breaking them. After this unraveling or tearing apart of the

fibers the fibrous paste-like mixture obtained is subjected to an operation the object of which is to flatten out the fibers, at the same time intimately mixing all the portions of the paste. This operation, which may be effected by subjecting the material to the action of two heavy millstones, must be prolonged a sufficient length of time to obtain a perfect homogeneity of the paste, and generally lasts a half-hour. At the time the paste is being subjected to the action of the millstones any suitable coloring-matter, as oxid of chrome or alizarin, may be added. At the same time chemical agents may be added, the object of which is to communicate to the product more or less hardness or suppleness. Thus if it is desired to obtain a hard product hydrated oxid of chrome is added to the paste while it is being worked, while if it is wished to obtain the new product in the form of a supple band alcohol is added. The oxid of chrome may serve both as a coloring-matter and as a hardening agent. The product may be rendered impermeable to water by adding formol during this operation. The material, colored or not, is then submerged in a solution of sulfate of zinc, tested to from 2° to 4° Baumé, where it is allowed to remain for two days, being stirred at intervals—every two hours, for example. The action of the sulfate of zinc is to precipitate and solidify the gelatinous and albuminous matters, (preserved by absence of the tanning of the hides,) the presence of which in a hardened state in the final product assures to the latter a perfect homogeneity, an intimate adhesion of the fibers, great compactness, and absolute imputrescibility and impermeability to grease. The hardness of the product obtained increases with the concentration of the sulfate-of-zinc bath. The material is then spread on cloths, if it is desired to obtain the final product in the form of bands or plates, the thickness of which may be varied as desired, or it is molded to any desired shape. The last operation to which the material thus prepared and molded or spread out is subjected is desiccation. The drying should be slowly effected and is preferably accomplished by applying pressure and then draining off and evaporating the moisture expelled by the pressure, these operations being repeated a number of

times until the final product is thoroughly dry. The pressure may be applied by a hydraulic press, the plates or bands of material being removed from the press from time to time and
 5 subjected to a current of warm air (the temperature of which should not exceed 40° centigrade) to evaporate the moisture squeezed to the surface by the pressure. When the material is molded in blocks, desiccation may
 10 be hastened by mounting the block on a rapidly-rotating spindle *in vacuo*. The moisture or liquid in the block is thus by centrifugal force projected from the center toward the periphery. Drying of the exterior layers
 15 of the block more than the center is thus avoided; but effective desiccation *in vacuo* can be effected without imparting any movement to the blocks.

When the new product is to be obtained in
 20 the form of bands, the latter can be laminated, left in the air to dry, and then passed into a flattening-machine, one of the rollers of which is heated.

The product obtained by means of this process is distinguished from those already known by numerous characteristics. It is, first, excessively hard and resistant, much more so than tanned natural leather, can be planed, carved, cut, and perforated with the greatest
 30 facility, these properties being due to the presence of the animal fiber running through the material. Screws and nails hold well in this product, and it can be polished. Its texture is uniform, very dense and compact, this homogeneity being due to the presence of the
 35 gelatinous and albuminous matters, which are eliminated from ordinary leather by the tanning, while in the present case they are preserved and solidified by the sulfate of zinc.
 40 From the presence of these matters another important advantage of the product results—*i. e.*, its absolute imputrescibility and its impermeability, especially to grease, oils, and fatty substances, in which it can be submerged
 45 for a long time without deteriorating, while other artificial leathers, as is known, deteriorate very rapidly in oil. A portion of a machine—a toothed wheel, for example—cut from a plate of the new product can therefore
 50 without injury be greased in the same manner as a metallic wheel. Furthermore, plates of the new product may be caused to adhere to each other very readily at a moderate temperature by the application of heavy
 55 pressure. A roller or cylinder formed by the superposition of several plates or disks thus united is as resistant as if it were formed of a single piece.

What is claimed is—

60 1. The process of manufacturing artificial material analogous to leather consisting in subjecting raw untanned hides or parts thereof to the action of lime for a time sufficient to soften the glutinous, gelatinous albumi-
 65 nous or other matter connecting the animal fibers thereby facilitating separation of the latter, then separating the fibers by disinte-

grating or tearing apart the hide, then flattening out the fibers at the same time intimately mixing the same with the other paste-
 70 like constituents and compacting or condensing the material, then subjecting the material to the action of a suitable bath to solidify the gelatinous and albuminous matters, and finally subjecting the material to high
 75 pressure and desiccating the same.

2. The process of manufacturing artificial material analogous to leather consisting in cutting raw untanned hides or parts thereof
 80 into small pieces or strips, subjecting the same to the action of lime for a time sufficient to soften the glutinous, gelatinous, albuminous or other matter connecting the animal fibers thereby facilitating separation
 85 of the latter, then separating the fibers by disintegrating or tearing apart the hide, then flattening out the fibers at the same time intimately mixing the same with the other
 90 paste-like constituents and compacting or condensing the material, then subjecting the material to the action of a suitable bath to solidify the gelatinous and albuminous matters, and finally subjecting the material to high pressure and desiccating the same.

3. The process of manufacturing artificial
 95 material analogous to leather consisting in subjecting raw untanned hides or parts thereof to the action of lime for a time sufficient to soften the glutinous, gelatinous, albuminous or other matter connecting the animal
 100 fibers thereby facilitating separation of the latter, then separating the fibers by disintegrating or tearing apart the hide, then flattening out the fibers at the same time intimately
 105 mixing the same with the other paste-like constituents and compacting or condensing the material, adding a suitable coloring-matter during or before the mixing, then subjecting the material to the action of a suitable bath
 110 to solidify the gelatinous and albuminous matters, and finally subjecting the material to high pressure and desiccating the same.

4. The process of manufacturing artificial material analogous to leather consisting in
 115 subjecting raw untanned hides or parts thereof to the action of lime for a time sufficient to soften the glutinous, gelatinous albuminous or other matter connecting the animal fibers thereby facilitating separation of the latter,
 120 then separating the fibers by disintegrating or tearing apart the hide, then flattening out the fibers at the same time intimately mixing the same with the other paste-like constituents and compacting or condensing the
 125 material, adding a suitable agent for imparting the desired flexibility or rigidity to the final product, then subjecting the material to the action of a suitable bath to solidify the gelatinous and albuminous matters, and
 130 finally subjecting the material to high pressure and desiccating the same.

5. The process of manufacturing artificial material analogous to leather consisting in
 135 subjecting raw untanned hides or parts there-

of to the action of lime for a time sufficient to soften the glutinous, gelatinous, albuminous or other matter connecting the animal fibers thereby facilitating separation of the latter, then separating the fibers by disintegrating or tearing apart the hide, then flattening out the fibers, at the same time intimately mixing the same with the other paste-like constituents and compacting or condensing the material, adding a hardening agent, then subjecting the material to the action of a suitable bath to solidify the gelatinous and albuminous matters, and finally subjecting the material to high pressure and desiccating the same.

6. The process of manufacturing artificial material analogous to leather consisting in subjecting raw untanned hides or parts thereof to the action of lime for a time sufficient to soften the glutinous, gelatinous, albuminous or other matter connecting the animal fibers thereby facilitating separation of the latter, then separating the fibers by disintegrating or tearing apart the hide, then flattening out the fibers at the same time intimately mixing the same with the other paste-like constituents and compacting or condensing the material, adding oxid of chrome, then subjecting the material to the action of a suitable bath to solidify the gelatinous and albuminous matters, and finally subjecting the material to high pressure and desiccating the same.

7. The process of manufacturing artificial material analogous to leather consisting in subjecting raw untanned hides or parts thereof to the action of lime for a time sufficient to soften the glutinous, gelatinous, albuminous or other matter connecting the animal fibers thereby facilitating separation of the latter, then separating the fibers by disintegrating or tearing apart the hide, then flattening out the fibers at the same time intimately mixing the same with the other paste-like constituents and compacting or condensing the material, then subjecting the material to the action of a sulfate-of-zinc bath to solidify the gelatinous and albuminous matters, and finally subjecting the material to high pressure and desiccating the same.

tion of a sulfate-of-zinc bath to solidify the gelatinous and albuminous matters, and finally subjecting the material to high pressure and desiccating the same.

8. The process of manufacturing artificial material analogous to leather consisting in subjecting raw untanned hides or parts thereof to the action of lime for a time sufficient to soften the glutinous, gelatinous, albuminous or other matter connecting the animal fibers thereby facilitating separation of the latter, then washing to remove all traces of lime, then separating the fibers by disintegrating or tearing apart the hide, then flattening out the fibers at the same time intimately mixing the same with the other paste-like constituent and compacting or condensing the material, then subjecting the material to the action of a suitable bath to solidify the gelatinous and albuminous matters, and finally subjecting the material to high pressure and desiccating the same.

9. A new artificial material analogous to leather composed of gelatinous, albuminous and fibrous constituents, obtained by disintegration of raw untanned hides or portions thereof without material breaking or shortening of the fibers and then solidifying the gelatinous and albuminous matters in a suitable bath, said material being of a fibrous uniform homogeneous texture hard and resistant, dense and compact, capable of being readily planed, carved, cut and polished, and impermeable and imputrescible particularly to greasy, oily and fatty substances to which the material may be subjected for a long time without deteriorating.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GEORGES GAUTIER.

Witnesses:

ANTONIO FERNANDO DE LA CALLE,
J. ALLISON BOWEN.