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ARTIFICIAL TANNED FABRIC AND PROCESS OF MAKING SAME.

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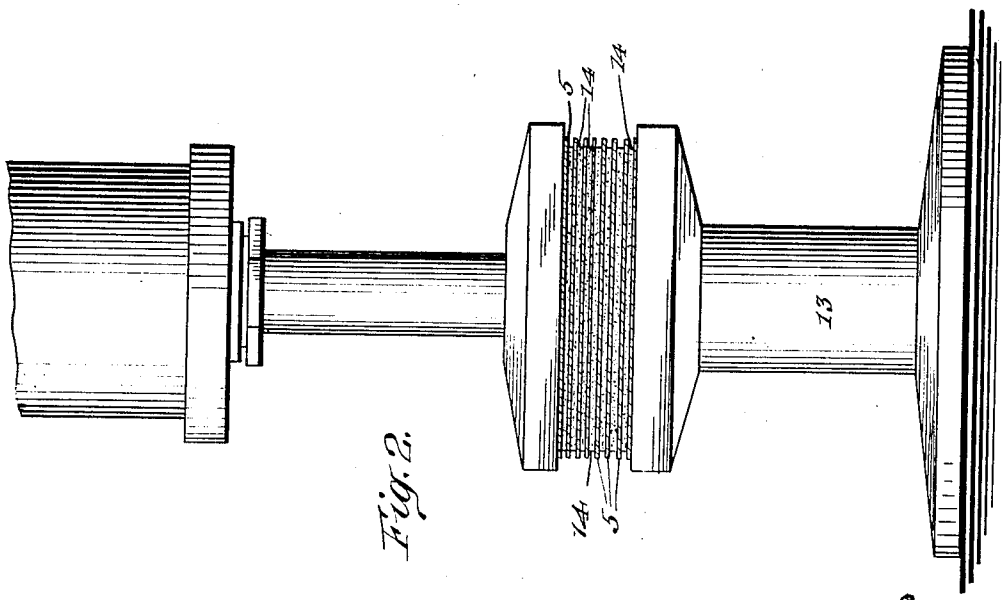


Fig. 2.

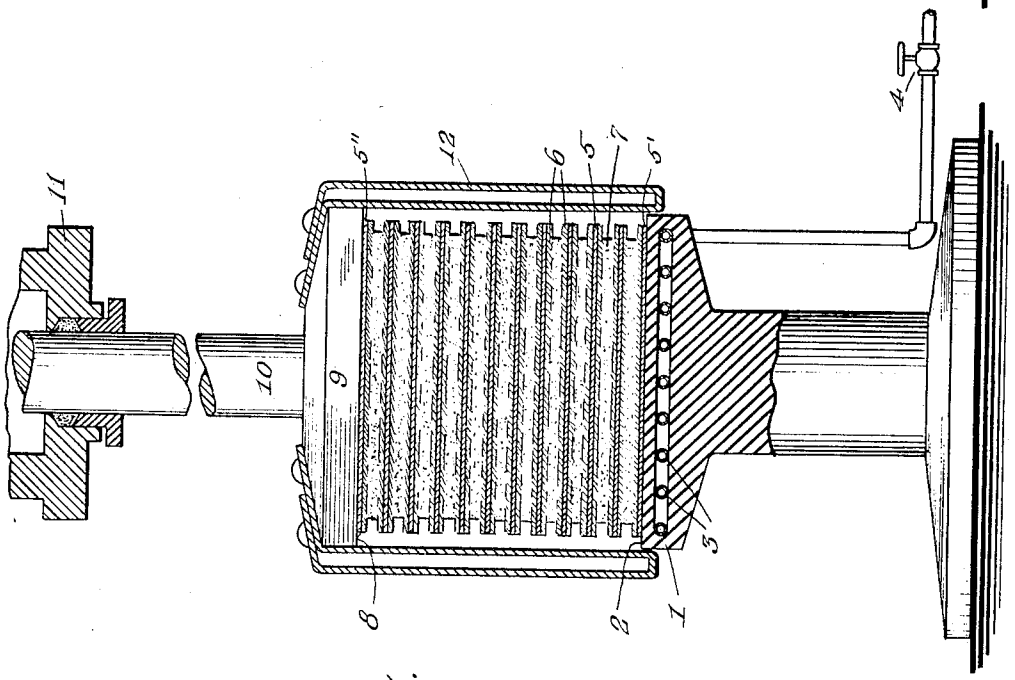


Fig. 1.

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UNITED STATES PATENT OFFICE.

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ARTIFICIAL TANNED FABRIC AND PROCESS OF MAKING SAME.

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To all whom it may concern:

Be it known that I, EMIL WEINHEIM, a citizen of the United States, and a resident of the borough of Manhattan, county, city, and State of New York, have invented certain new and useful Improvements in Artificial Tanned Fabrics and Processes of Making Same, as set forth in the following specification.

This invention relates to a process for making an artificial composite fabric.

An object of the invention is to produce a fabric which shall have the inherent structural qualities of tanned leather, and more particularly the qualities of toughness or resistance, suppleness, flexibility, durability and feeling to the touch.

Further objects of the invention are to cheapen and improve the process for making artificial leather.

The process results in a product which may be made of any desired uniform thickness and which is actually more durable and stronger than animal leather.

More particularly an object of the invention is to so arrange the steps and operatings of the process that advantage may be taken of the nature or physical state of a special impregnating and saturating composition to insure thorough and uniform impregnation of the fibrous body and subsequently effect or bring about the quality of insolubility of said composition throughout the entire composite fabric.

A further object of the invention is to effect the thorough impregnation of the fibrous body in an improved manner and under improved conditions.

To this end it is an object to impregnate a matted fibrous body with a soluble leatherfying composition which is insolubilized *in situ* in and about the fibers of the said body fabric for the better practice of the invention.

It is also an object to provide, as an initial step, a soft fluffy batting of matted fibers which is thoroughly dried but completely dichromatized throughout. The expression "dichromatized" is used to designate having a deposit of crystalline dichromate of potassium in and about the fibers of the fibrous body, although it is to be understood that any suitable insolubilizing chemical is contemplated although dichromate of potassium has been found to be most effective.

The above and further objects of the invention will be apparent from the following description and drawings which form part of this application, in which like characters designate corresponding parts and in which,—

Figure 1 is a diagrammatic vertical section showing mechanism for furthering the process, especially an early stage of the process; and Fig. 2 is a similar figure showing other mechanism and parts for use at a later stage.

In practicing this process it is desirable to provide first a mat or batting of fibrous substance, preferably vegetable fibers, and still more preferably cotton fibers. It has been found that long fibers increase the strength of the finished product. It has also been found that a substantially equal mixture of long and short fibers results in a finished product comparing in strength, durability, etc., very favorably with one made up from a body of entirely long fibers. It is of course to be understood that the longer fibers are more expensive than the shorter. This feature of mixing long with short fibers has the commercial advantage of cheapness without sacrificing strength and durability. Preferably, therefore, various proportions, according to the desired strength of the ultimate product, of long and short cotton fibers are matted into a batting of uniform thickness which thickness may vary according to the desired thickness of the finished product, so that its weight per square yard may vary satisfactorily from 125 grams to 800 grams or more or less as desired. The batting may be formed into suitable strips or rolled strips as convenient. The next step is to change the batting body into a body of dichromatized fibers. To this end there is provided an aqueous solution of dichromate of potassium, say a three to a ten per cent. solution according to the amount of deposit required, and as will hereinafter be apparent. This dichromate of potassium solution is sprinkled uniformly upon the batting described so as not to destroy its character as a strip of batting. During this process a suitable supporting surface for the batting is desirable. The batting then should be dried after a complete impregnation of all its fibers has been accomplished by the sprinkling. Care should be taken that the batting resume its original fluffiness or looseness of texture subsequent to drying after being impregnated with the solution of dichromate. After this step the batting may be termed a dichromatized batting. Care should also be taken that the impregnation with dichro-

mate is uniform and complete insuring a uniform crystalline deposit of dichromate upon and in each and all of the fibers of the batting after suitable drying has taken place. For the next step, the batting may be cut into sheets or strips of suitable size, it being borne in mind that the size and shape of a finished sheet of fabric will resemble that of the initial sheet of batting. Metallic plates of a size slightly larger than the sheets of batting, thus provided, are furnished. These metallic plates may be of zinc or other suitable metal, and it may be desirable that they be sufficiently thin to provide a certain degree of flexibility. An improved leatherfying composition for saturating the sheets of batting is then compounded, as follows, or the same should have been previously prepared and ready at hand at this step of the process.

The following ingredients are mixed and combined in suitable proportions easily determined by experiment and subject to considerable variation but such that the resulting mass is sufficiently fluid for coating purposes when at a temperature of from sixty to eighty degrees Fahrenheit. The parts are as follows:—1. Viscous animal parts, such as bone glue, glutin and other glutinous matter of animal origin. 2. Vegetable oils, such as palm oil, olive oil and others. 3. Hydrocarbons, such as paraffin, vaseline, bitumen or others. 4. Animal fats, such as tallow, suet and others. 5. Metallic salts, such as hydrated oxid of zinc, potassium, lead and aluminum. 6. Suitable saponifying agents, such as sodium and potassium alkalies.

It is well to keep the viscous animal parts in water previously to use, so as to aid their ready fusibility and manipulation. A suitable vessel with means for heating the same is provided and may be a steam heated caldron. The first five sets of ingredients, it being understood that one or more of the specified ingredients in each set can be used, are kneaded and mixed together under the influence of heat, until a uniform mixture is accomplished. The saponifying agent should then be added and heating continued until satisfactory saponification of the mixture has been accomplished. The preferable temperature during saponification is from eighty to ninety degrees Fahrenheit.

With the composition above described or with any composition having suitable qualities maintained at an even temperature of from sixty to eighty degrees Fahrenheit, the same is suitably applied to the metallic plates which have been previously described. The coating should be uniform on both surfaces of the plates and its thickness will correspond somewhat to the viscosity of the coating composition.

In the figures, 1 indicates a suitably supported lower table of a power press having a horizontal top surface 2. Suitable heating means is provided and is shown in the form of steam ducts 3 formed in the base or table 1, the valve 4 serving as means for regulating the intensity of the steam pressure and its consequent temperature within the ducts 3. One of the metallic plates referred to, is coated merely on its top surface and is applied to the flat horizontal surface 1 of the power press. A sheet of the dichromate impregnated batting is then superposed upon the coated side of this plate, whereupon the second metallic plate, coated on both surfaces, is superposed upon this sheet of batting. A second sheet of batting is superposed and a third of the metallic plates, etc., etc., until a tier of alternating coated metallic plates and sheets of batting are built up of a suitable total thickness, say ten or more inches.

In the figure, 5 indicates the metallic plates, while 6 indicates the coatings of composition, as described, and 7 the intermediate sheets of dichromate impregnated batting. The bottom metallic plate, which is coated merely upon its upper surface, is indicated by 5′. It is also to be understood that it is preferable that the upper metallic plate, indicated by 5″, be coated with the composition only on its lower surface. It is also to be understood that a plurality of sheets of batting 7 may be arranged intermediate adjacent plates 5, if desired, and to regulate the thickness of the finished product.

8 indicates the lower horizontal surface of the top portion 9 of the power press and may be pressed forcibly toward the surface 1 by means of the piston 10 operated by the power mechanism shown in the form of a hydraulic cylinder 11. A heat non-conducting and containing hood 12 preferably may be provided to inclose the sides of the built up parts 5, 6 and 7 and as indicated. When the parts have been arranged as shown diagrammatically in Fig. 1, heat is applied to the tier by means of the steam coils or otherwise and pressure is gradually applied to the entire stack of plates and sheets. The pressure and heat should be continued for several hours until a uniform temperature upward of seventy degrees Fahrenheit has been imparted to and through the entire tier. The metallic plates serve as good heat distributers. The pressure applied should be regulated in accordance with the progress of the process, which may be inspected through suitable openings provided in the hood 12, but should increase gradually.

During the compression and heating the coatings 6 of composition are forced uniformly into the batting from both surfaces wherein it impregnates each and every fiber of the batting and encounters the crystallized composition of dichromate of potassium which is believed to have a peculiar action under these conditions. In any event it is

found that by this process the finished product is almost absolutely insoluble even in boiling water. Before its application to the batting as aforesaid, the impregnating composition described was to a degree soluble in water. After remaining for the desired length of time in the heated press shown in Fig. 1, the stack of sheets and plates should be removed to the cold press 13 shown in Fig. 2, when the coatings 6 and sheets of batting 7 have been combined into a homogeneous mass indicated by 14. The plates and sheets should be left under pressure in this press for a number of hours, after which it is desirable to remove them to a drying room, which removes impregnated moisture which appears to be of a non-combined nature, that is, to have been removed from the fatty and gelatinous impregnating composition described. After drying, the sheets are ready for use in any of the many and varied arts to which tanned animal leather is applicable. They may be subsequently coated or treated as for embossing or otherwise, according to any of the well known processes for finishing or treating tanned animal leather. Emphasis should be laid upon the uniformity of the product thus produced both as to its thickness, texture and composition.

Although I have described my process and have given the ingredients used therein as preferred, it is to be understood that the steps of the process may be practiced in a different sequence and with varying proportions in the compositions, it being particularly borne in mind, however, that an important feature is that dichromate of potassium in solution or its equivalent be first impregnated into the batting, the batting be maintained fluffy and dry and that the leatherfying composition be uniformly forced into the dry batting then having a deposit of dichromate of potassium throughout its entire structure, and the subjection of the structure to heat.

What is claimed and what is desired to be secured by United States Letters Patent is:—

1. The process of forming an homogeneous fabric impervious to moisture comprising the production of a dry, fluffy batting of matted fibers dichromatized throughout; forcing a soluble leatherfying composition into and throughout said fluffy batting and compacting it by lateral pressure; and effecting the insolubilizing of said leatherfying composition in and about the said fibers under continued pressure and heat.

2. The process of forming an homogeneous fabric impervious to moisture comprising the production of a dry, fluffy batting of matted fibers dichromatized throughout; forcing a soluble leatherfying composition comprising animal parts and oily matter into and throughout said fluffy batting and compacting it by lateral pressure; and effecting the insolubilizing of said leatherfying composition in and about the said fibers under continued pressure and heat.

3. The process of forming an homogeneous fabric impervious to moisture comprising the production of a dry, fluffy batting of vegetable fibers dichromatized throughout; forcing a soluble leatherfying composition comprising viscous animal parts, vegetable oils, hydro-carbons, animal fats, metallic salts and a saponifying agent into and throughout said fluffy batting and compacting it by lateral pressure; and effecting the insolubilizing of said leatherfying composition in and about the said fibers under continued pressure and heat.

4. The process of forming an homogeneous leatherlike fabric comprising the production of a soft, fluffy batting of matted fibers and of uniform thickness; gently sprinkling said batting while supported from its under-surface with a solution of dichromate of potassium and the drying out of the water of the said solution while the batting is still supported from its under-surface whereby the batting becomes a dry fluffy batting of dichromatized fibers; forcing a saponified leatherfying composition comprising animal and mineral oily matter and animal gelatinous matter uniformly into said batting from both its surfaces; and subjecting the so saturated batting to continued heat and pressure.

5. The process of forming an homogeneous leatherlike fabric comprising the production of a dry, fluffy batting of dichromatized matted fibers; coating the surfaces of flat metallic plates with a pasty mass of soluble leatherfying composition; forming a tier of alternating coated plates and sheets of said batting; and subjecting said tier to continued heat and pressure between flat parallel surfaces, to form homogeneous moisture resistant sheets of artificial leatherlike fabric.

6. The process of forming an homogeneous leatherlike fabric comprising the production of a dry, fluffy batting of dichromatized matted fibers; coating the surfaces of flat metallic plates with a pasty mass of soluble leatherfying composition; forming a tier of alternating coated plates and sheets of said batting; subjecting said tier to continued heat and pressure between flat parallel surfaces, to form homogeneous moisture resistant sheets of artificial leatherlike fabric; and removing the said sheets from the said flat plates and exposing the said sheets to a drying atmosphere.

7. A step in the process of forming artificial leather comprising the uniform sprinkling of the surface of cotton batting with a solution of dichromate of potassium and the subsequent drying of said sprinkled batting all under conditions to insure the retention of the original fluffy character of the batting.

8. As an article of manufacture, a dry, soft fluffy batting of matted cotton fibers dichromatized throughout.

9. As an article of manufacture, the product of the process described, a sheet of artificial tanned leather comprising a body of matted and dichromatized vegetable fibers; and a body filling of leathery composition of viscous animal parts, oils, animal fats, metallic salts and an alkali, as described, insolubilized *in situ* in and about the said fibers and forming a close union with the said fibers throughout the said body.

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

EMIL WEINHEIM.

Witnesses:
LEONARD DAY,
EDSON B. SAMMIS.