

# UNITED STATES PATENT OFFICE.

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## PROCESS OF BLEACHING LEATHER.

SPECIFICATION forming part of Letters Patent No. 680,334, dated August 13, 1901.

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*To all whom it may concern:*

Be it known that we, WILLIAM H. KRUG, residing at Washington, in the District of Columbia, and EDWIN JAMES HALEY, residing in the city, county, and State of New York, citizens of the United States, have invented certain new and useful Improvements in Processes of Bleaching Leather, of which the following is a specification.

10 A bleaching liquor is first prepared by forming an aqueous solution of tanning material in any well-known manner, the strength of the solution depending upon the character of the leather and the tannery practice; but in  
15 our process the bleaching solution is preferably approximately of the same or of greater density than that to which the leather was last subjected in the preceding tanning process. To this solution of tanning material  
20 there is added a quantity of alkali or combination of alkaline ingredients not only sufficient to clarify the same or dissolve the insoluble constituents naturally present in the tanning material, but in such excess as to se-  
25 cure the bleaching effect desired—that is, the color which it is desired to impart to the leather—and according to the nature of the tanning material used. For securing leather of light colors the proportion of alkali is  
30 greater than when darker-colored leathers are desired, and if the bleaching liquor is formed of a solution obtained from a bark the proportion of alkali will be less than if it is formed from some other materials, as que-  
35 bracho extract. The mixture thus obtained is then heated preferably to a temperature of between 100° and 140° Fahrenheit and is maintained during treatment at as nearly as possible a uniform temperature and is also main-  
40 tained as nearly as possible at a uniform strength or density by adding at intervals such quantities of tanning material and alkali as are requisite for this purpose. The leather is immersed in the bleaching liquor and is  
45 maintained therein for a short period of time, as from one to ten minutes or more, according to the character of the leather and the effect desired, the immersion being continued for a greater length of time to secure a denser  
50 product.

In using the term "alkali" we include there-

by an alkali, alkaline salt, or alkaline combination of ingredients—as, for instance, sodium carbonate or borax or a combination thereof.

After the treatment in the alkaline bleach-  
55 ing-bath the leather is transferred to an acid-bath. This acid-bath consists of a weak aqueous solution of any suitable mineral or organic acid, as sulfuric or hydrochloric or ox-  
60 alic acid or a combination thereof, the solution varying in strength according to the character of the leather and the density of the bleaching alkaline liquor previously used, but  
65 being maintained as nearly as possible at a uniform strength during the treatment of the mass of leather to secure uniform results. The acid-bath is preferably maintained at as  
70 nearly a uniform temperature as possible—say from 100° to 140° Fahrenheit—and the leather is immersed therein and permitted to remain  
75 from one to ten minutes or longer, according to the color and properties desired, the longer immersion securing a lighter color and heavier or denser leather. After the acid treatment  
the leather is removed, drained, and washed with water to remove the acid. If it is de-  
80 sired to modify the color of the leather after this acid treatment, the leather may be immersed in a solution of tanning material,  
85 either with or without the addition of alkali, and be allowed to remain therein until the desired color effect is attained. This may be done before the leather is washed with water.

In bleaching hemlock-tanned sole-leather  
85 our process may be carried out as follows: Assuming that the tanning liquor in the last layer from which the leather is taken has a density of 40° barkometer, we make up an  
90 alkaline bleaching-bath of a density of 45° barkometer by dissolving ninety-two pounds of quebracho extract, fourteen pounds of borax, and twenty-eight pounds of sodium carbonate in every ten cubic feet of water, (six hundred and twenty-five pounds.) This  
95 bath is heated to 140° Fahrenheit, and the leather taken directly from the last layer in which the tanning operation has been completed is immersed therein for five minutes, whereupon it is removed, drained for a few  
100 minutes, and then immersed in the acid-bath, which is prepared as follows: Five pounds of



sulfuric acid are dissolved in every ten cubic feet of water and the solution is heated to 140° Fahrenheit. In this acid-bath the leather remains for five minutes, whereupon it is removed and rinsed thoroughly in cold water.

When operating on a large number of sides, it is found necessary to strengthen both the alkaline bleaching-bath and the acid-bath from time to time. In practice the density of the alkaline bath may fall to 40° barkometer, whereupon we add a sufficient quantity of a very concentrated aqueous alkaline solution of quebracho extract containing the same ingredients as the alkaline bleaching-bath and in the same proportions until the density of the alkaline bleaching-bath again becomes 45° barkometer. The acidity of the acid-bath is maintained by adding after every fifty sides which have been immersed therein from three-tenths to five-tenths of a pound of sulfuric acid for every ten cubic feet of water. If it is now desired to impart to this bleached leather an oak color, the leather is immersed in a liquor made from oak-bark having a density of 40° barkometer and a temperature of 100° Fahrenheit and allowed to remain therein until the desired color is obtained.

The above sets forth specifically one application of our invention; but it is to be understood that the invention is not limited thereto, as the particular ingredients, their particular proportions in the baths, and the density and temperatures of the baths depend upon tannery practice.

The above-described treatment results in very material advantages over the ordinary processes of bleaching. First, the leather instead of being reduced in weight is maintained or increased in weight, and consequently is of greater density, resulting in greater durability of the articles made therefrom; secondly, the bleach instead of being a surface bleach is one which may, if prolonged, affect the entire fiber of the leather, so that the articles made therefrom will not vary in color from the effects of wear; thirdly, it is practicable by varying the strength of the solution to produce any desired shade, and therefore to operate upon a mass of leather with uniform results in this respect.

As before stated, it is preferable to make use of an alkaline bleaching-bath in which the proportion of tanning material is stronger than that from which the leather was last taken in the preceding tanning operation; but it is possible to carry out our process with a bleaching solution in which the tanning material is in a less proportion. The use of a bleaching solution consisting of tanning material, however, in connection with a sufficient quantity of alkali to produce the bleaching effect, instead of reducing the weight and

density of the product, as usual, will maintain or increase it, and in proportion as greater weight is desired it is desirable to increase the proportion of tanning material and alkali in the solution.

Without limiting ourselves to the precise temperature, proportions, and materials specified, we claim—

1. In the art of bleaching leather, the process substantially as hereinbefore described, which consists in subjecting leather, after the tanning operations, to the action of a solution of tanning material and alkali, in which the tanning material is approximately as strong as that to which the leather was last subjected and in which the alkali is in excess of the amount necessary to clarify and sufficient to produce the bleaching effect.

2. In the art of bleaching leather, the process substantially as hereinbefore described, which consists in subjecting leather, after the tanning operations, to the action of a solution of tanning material and alkali, in which the tanning material is approximately as strong as that to which the leather was last subjected and in which the alkali is in excess of the amount necessary to clarify and sufficient to produce the bleaching effect, and then subjecting the leather to the action of an acid-bath.

3. In the art of bleaching leather, the process substantially as hereinbefore described, which consists in subjecting leather, after the tanning operations, to the action of a solution of tanning material and alkali, in which the tanning material is approximately as strong as that to which the leather was last subjected and in which the alkali is in excess of the amount necessary to clarify and sufficient to produce the bleaching effect, then subjecting the leather to the action of an acid-bath, and then subjecting the bleached leather to a solution of tanning material with or without the addition of alkali to change its color.

4. In the art of bleaching leather, the process substantially as hereinbefore described, which consists in subjecting the same, after tanning operations, to the action of a solution of tanning material and alkali, in which the proportion of tanning material is greater than in the last tanning liquor, and thereafter immersing in an acid-bath.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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Witnesses as to William H. Krug:

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