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J. B. WELCH ET AL

PROCESS FOR FINISHING LEATHER

Filed Jan. 19, 1925

Fig. 1.

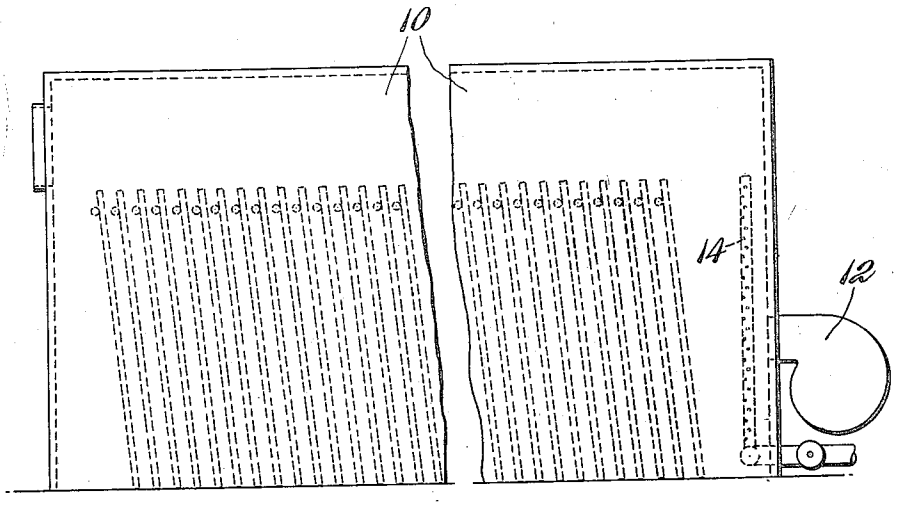
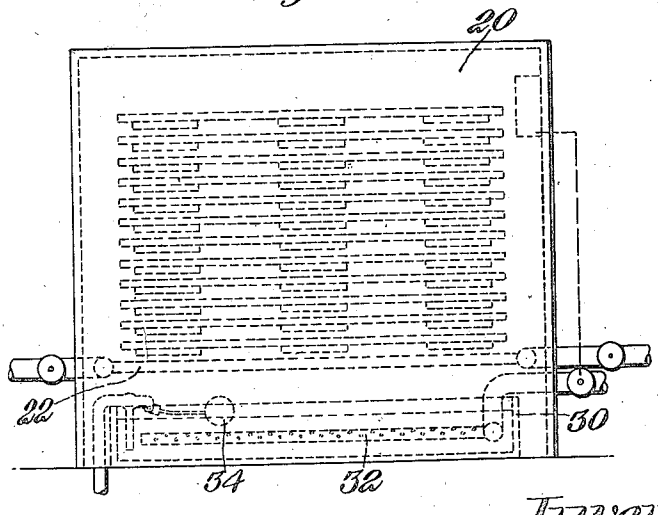


Fig. 2.



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UNITED STATES PATENT OFFICE.

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PROCESS FOR FINISHING LEATHER.

Application filed January 19, 1925. Serial No. 3,271.

To all whom it may concern:

Be it known that we, JOHN B. WELCH and WILLIAM C. WELCH, citizens of the United States, and residents, respectively, of New Orleans, in the parish of Orleans and State of Louisiana, and of Newton, in the county of Middlesex and State of Massachusetts (whose post-office addresses are, respectively, 373 Audubon St., New Orleans, and South St., Waltham), have invented certain new and useful Improvements in the Processes for Finishing Leather; and they do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a process for finishing leather, and particularly to a process for making patent leather.

The object of the invention is to provide a novel and superior process for finishing the leather, and particularly for making patent leather, by which finished leather of superior quality character of grain, appearance and workability may be produced at a minimum manufacturing cost.

To this end the invention consists in the process hereinafter described and particularly defined in the claims at the end of this specification.

The drawing diagrammatically illustrates the apparatus which it is preferred to utilize in practicing the present process;

Fig. 1 is a longitudinal vertical section and

Fig. 2 is a transverse vertical section.

In the processes heretofore employed for finishing leather, such, for example, as the process for making patent leather, the tanned hides in the condition in which they are received from the tanners are stretched or secured in open wooden frames by means of toggle strings secured to different marginal portions of the hides, and which are tacked to the frame. An initial or so-called daub coat of coating material is then applied and spread evenly over the surface of the hide, and in this condition the hides are then placed in the sun in an open yard to permit the daub coat to harden, an operation which consumes approximately five hours. In some instances, the daub coat is dried by circulation and artificial heat in closed chambers at temperatures of approximately 130° F. After the daub coat has hardened a second or finishing coat is applied directly over the daub coat, and the frame with the hides are placed in ovens and the coat baked until hardened at a temperature of approximately 140° F. The action of the sun and the exposure to the heat and also the baking within the oven operates to shrink the leather during the first portion of the drying or hardening of the coatings, and before the coating has hardened so that the finished coating is bonded to the hide in a shrunken condition of the latter. The extent of shrinking of the leather varies according to the condition and quality of the hide, but on an average the area of the hide decreases in the neighborhood of 2% with each drying, and as a result the finished leather has an area in the neighborhood of 4% to 5% less than the original area of the hide in the condition in which it was received from the tanner. The potential stretching properties of the shrunken leather are, however, proportionately increased so that it is possible to stretch the leather itself an amount corresponding to the shrinkage, namely about 4% or 5% of its area, in addition to the natural stretch possessed by the leather. As a result, when the finished leather is pulled over the last having been dipped in warm water as is the usual practice in shoe factories, the leather is oftentimes stretched greatly in excess of the amount that it is possible for the varnish or finish to stretch, with the result that the latter cracks. The loss resulting from the cracking of the finish in the manufacture of patent leather shoes is a real one, oftentimes resulting in large damage claims against the leather finisher and necessitating the constant employment of repair operators for repairing the cracked finish as a part of the regular personnel of the shoe manufacturing organization.

In accordance with the improved process for manufacturing patent leather to which the present invention is preferably applied, provision is made for counteracting the tendency of the leather to shrink when the coating material is hardened, and this is preferably accomplished by hardening the coating material in an atmosphere sufficiently humid to cause the leather to remain in an expanded or stretched condition until the coating material has become hardened and

firmly bonded with the leather in such condition.

In detail the preferred process for manufacturing patent leather is described as follows: The tanned hides in the condition in which they are received from the tannery are first subjected to treatment to permit them to absorb moisture, preferably by being hung up in a room or chamber in a humid atmosphere. An exact control of the humidity is not necessary, but we have found that sufficient humidity may be produced by injecting steam into the room so that exposure of the hides for a period of a few hours, preferably about a half a day, enables them to absorb sufficient moisture to permit them to be stretched into a condition of maximum expansion. When the leather to be finished has been degreased at the tannery it has shrunken during the degreasing operation an amount varying from 2%–5% of its original area and it has been found that the preliminary humidification of the degreased leather operates to cause the hides to expand into the dimensions originally assumed before the degreasing operation when the hide is stretched.

It is preferred to expose the hides to humidity whether they have been previously degreased or not, as by so doing the leather is rendered more susceptible of being completely drawn out when stretched upon the frames, and as a result the finished leather produced is of highest quality, appearance and character, as will be described.

After the hides have been thus exposed to the preliminary humidification, they are stretched in the usual manner upon the wooden frames, and then the daub or initial base coat may be applied in the usual manner. When the humidified leather is thus stretched upon the frame, the individual hair cells are believed to be opened or expanded, permitting the daub coat to penetrate with better advantage, and to thereby produce a superior bond between the finish and the leather. The daub coat is then dried, and for this purpose the frame and hides are preferably placed in a closed heated chamber 10 provided with a blower or fan 12 for circulating the air therein and for removing the solvent gases evaporated from the daub coat. The temperature of the room is preferably maintained at a low point, approximately 110° F., and in order to prevent any shrinkage in the leather at this time provision is made for introducing moisture into the chamber 10, and this may be conveniently accomplished by injecting steam from discharge nozzles 14 or in any other suitable manner. An excess of humidity appears to have little or no effect upon the rapidity of drying or hardening the daub coat, a period of approximately 12 hours being sufficient for this purpose.

After the daub coat has hardened the frames and leather are removed from the dry room 10, and a finishing coat is applied in the usual manner over the daub coat. After the finishing coat has been applied, the frames and leather are placed in ovens 20, which may, and preferably will, be of the general construction now employed, having provision for sustaining the frames horizontally therein, one frame superposed above the other, and each spaced a short distance from the next. The ovens are provided with the usual steam coils 22, preferably located at the bottom thereof, and during the drying or hardening of the finish coat a temperature of 150° F. is preferably maintained for a period of about 21 hours until the drying is completed. In order to prevent shrinkage of the leather during this drying or hardening operation, the ovens 20 may and preferably will be provided with means for humidifying the air therein. For this purpose a tank 30 containing water may be located within the oven at the bottom thereof, and a perforated pipe 32 positioned within the tank.

With this arrangement steam is supplied to the perforated pipe 32, and the steam emerging through the perforations in the pipe boils the water in the tank 30, thus supplying the required humidity. The water within the tank may be maintained at a constant level by a ball float 34 of usual construction, and the supply of steam to the pipe 32 may and preferably will be controlled by automatic humidity controllers of any usual or preferred type, the construction and operation of which are well known and need not be further described. With this arrangement the humidity within the oven is preferably maintained during the drying of the finish coat at an amount corresponding to a dry bulb temperature at 150° F. and a wet bulb temperature of 125° F., but other temperatures with a corresponding high humidity are also satisfactory, and in this manner shrinkage of the leather during the drying operation is prevented. It is of advantage to employ a humidifying system as above described in order to prevent appreciable circulation of the air within the oven during the drying of the finish coat to the end that the surface of the coat may accumulate as little dust and dirt as possible during the drying thereof, but if found desirable other forms of humidifying apparatus may be used.

For finishing certain kinds of leather additional finish coats may be applied in the usual manner, and the coatings dried in ovens 20 employing humidity to prevent shrinkage of the leather. After the finish coatings have been applied and dried as above described, the leather may be sun dried or dried by any of the processes here-

tofore proposed and because of the fact that the several coatings have been applied to and dried upon the leather while the latter has been maintained in its expanded condition the final exposure to the sun does not operate to appreciably shrink the leather, although if desired, before shipment the leather may be stood over night in a humidified atmosphere.

From the description thus far it will be observed that the present process is of particular advantage to the tanner or finisher of the leather for the reason that the finished hide has maximum area, and may be sold at a proportionately higher price. For example, in the ordinary process the sunning and subsequent drying or baking without the use of humidity causes a hide to decrease in area approximately 5%. In other words, the finished hide has lost approximately 5% in area during the finishing and this adds approximately 1½ cents per foot to the cost. Inasmuch as an ordinary finishing plant turns out a number of thousand of feet per day, it will be apparent that the saving is a real one. In addition, when the leather to be finished has been degreased at the tannery, it has, as above described, been shrunk during the degreasing anywhere from 2% to 5%. In accordance with the present process this shrinkage is restored to the hide representing a proportionate saving to the tanner or to the finisher.

The most important advantage of the present process is the fact that the leather is finished under such conditions that the finished product possesses only sufficient stretch that it may be successfully drawn over the last in the manufacture of the shoe without stretching the leather beyond what may be regarded as the elastic limit of the varnish or finish so that the cracking which oftentimes occurs is prevented. This is very important from the point of view of the shoe manufacturer because the partially finished shoe represents more loss than merely the finished leather itself. As a matter of fact, shoe manufacturers have refused to pay anything for leather which cracks or works poorly in the factory and in some instances have been known to make damage claims against the tanner for damaged shoes. These damage claims run into large sums of money.

In addition to these advantages the present process produces superior finished leather. In the ordinary process the finishing coats are applied to the leather with the pores of the latter in a closed or partially closed condition, whereas in the present process the leather is placed in a condition such that it may be stretched before the finishing coats are applied which seems to effect an opening of the pores, and prevents it from shrinking during the finishing and as a result an improved grainy appearance is imparted to the leather which adds to the character and is very important from the sales point of view of the finished leather, inasmuch as the superior character of the leather commands higher prices. The advantages of the present process may, therefore, be summed up as follows: The finished leather produced possesses superior appearance, works better in the shoe factories than ordinary finished leather, and the shoes may be produced therefrom more economically than from leather of present manufacture.

The humidity employed in drying the coating material as above-described prevents the breakage of the toggle strings so that the leather is maintained in a stretched condition in the wooden frames during the drying operation. In addition to the saving in the labor involved in retacking the hides in the frames when the toggle strings break, the leather is maintained in a position such as to permit a most uniform drying of the coat. The humidity also adds considerably to the life of the wooden frames and inasmuch as these represent a substantial investment for the leather finisher, this is an important advantage of the present process. In addition, higher temperatures may be used in baking the finished coats without injury to the same.

The material employed for the various coatings may and preferably will comprise that usually employed for this purpose at the present time, although any material may be employed which is found suitable for producing the desired coatings.

Having thus described the invention, what is claimed is:

1. In a process of finishing leather, the steps comprising first humidifying the leather, stretching the same, applying coating material to the stretched leather, and thereafter drying the coating material under conditions which counteract the tendency of the leather to shrink during the drying operation.

2. In a process of finishing leather, the steps comprising humidifying the leather, stretching the same, applying a daub coat to the stretched humidified leather, hardening said daub coat in a humidified atmosphere, applying a finishing coat over the daub coat, and thereafter drying the finishing coat in a humidified atmosphere.

3. In a process of finishing leather, the steps comprising applying a layer of coating material to the leather and drying the coating material under conditions which counteract the tendency of the leather to shrink during the drying operation.

4. In a process of finishing leather, the steps comprising applying a daub coat to the leather, drying the daub coat in a humidified atmosphere without shrinking the

leather, applying a finishing coat over the daub coat, and baking the leather to harden the finishing coat without appreciably shrinking the leather.

5. In a process of finishing leather, the steps comprising stretching the leather, applying a coating to the leather while the latter is maintained in a stretched condition, and thereafter drying the coating under conditions which counteract the tendency of the leather to shrink during the drying operation.

6. The process of finishing leather which consists in humidifying the leather, stretching the same, applying a daub coat to the stretched, humidified leather, hardening the daub coat in a humidified atmosphere in a drying chamber, applying a finishing coat over the daub coat, and thereafter hardening the finishing coat in a humidified atmosphere.

7. In the process of finishing degreased leather, the steps which comprise first humidifying the leather to restore the degreasing shrinkage, applying a layer of coating material to the leather, and thereafter drying the coating under conditions which counteract the tendency of the leather to shrink during the drying operation.

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