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APPARATUS FOR DRYING LEATHER

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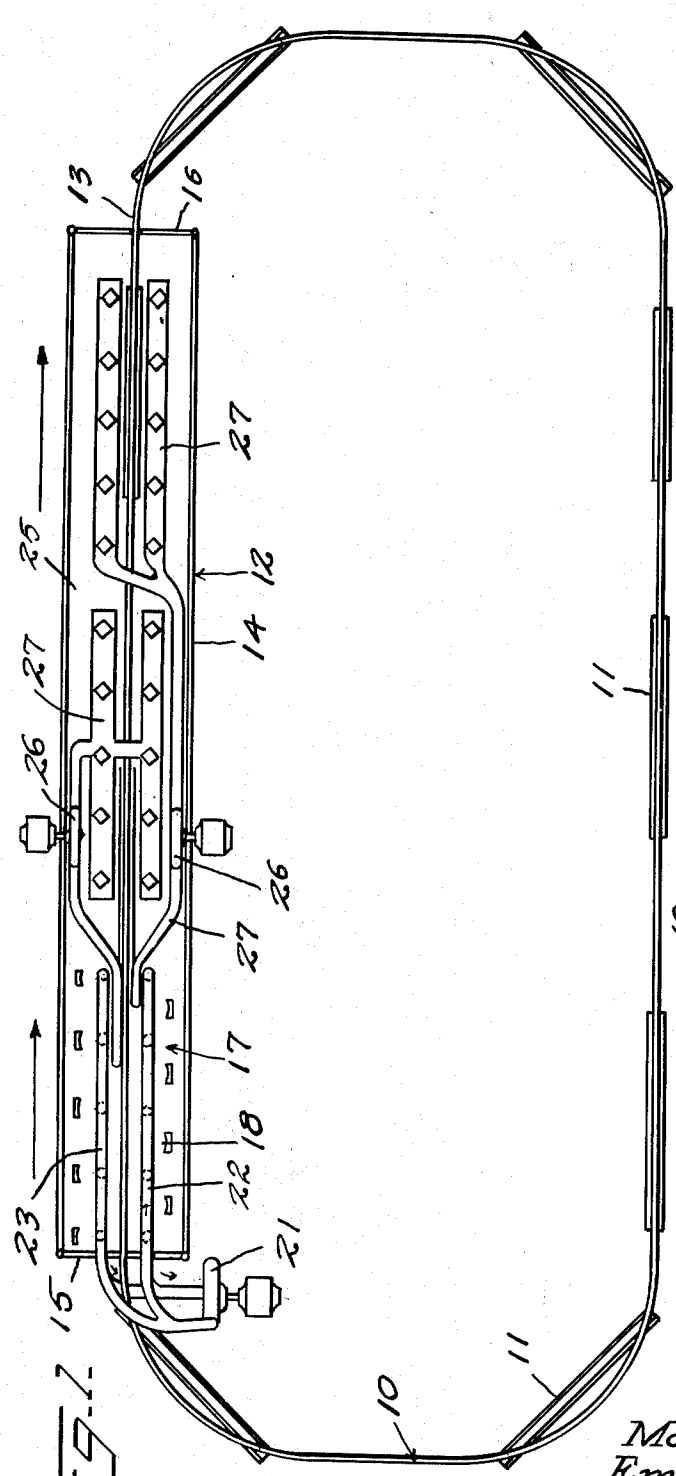


FIG. 1.

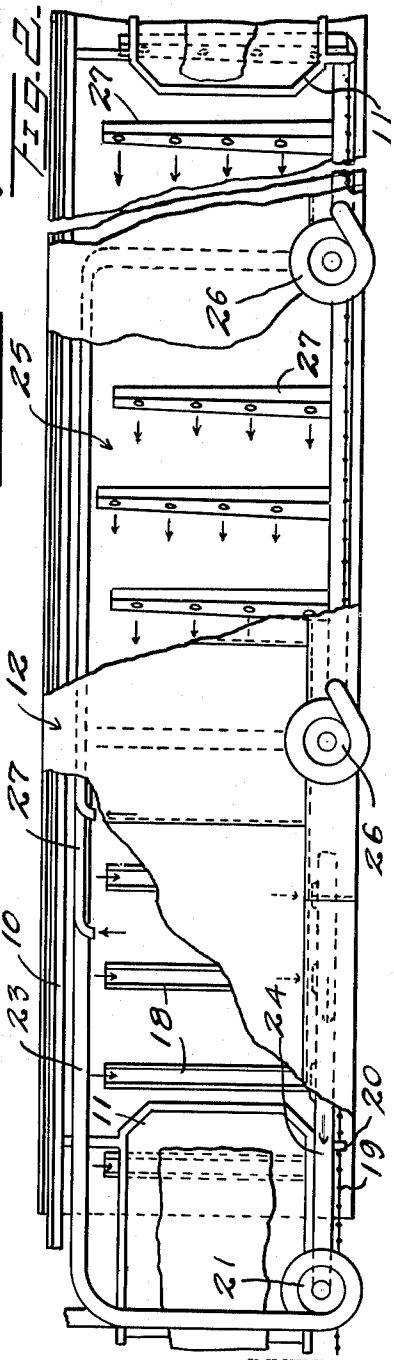


FIG. 2.

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APPARATUS FOR DRYING LEATHER

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1 Claim. (Cl. 34—68)

This invention relates to apparatus for drying leather and is especially applicable to the drying of chrome tanned leather but is not limited thereto.

In the known and now generally used conventional process of drying tanned leather, the skins having therein the fat liquor and after having been wrung and set out, are pasted to a carrying plate with a starch type or potato derived paste, the plates being of glass, and the thus mounted skins are conveyed into a chamber having a temperature of from 100 to 120 degrees Fahrenheit where they are then left for from three to eight hours or more, some circulation of air being in some cases provided. This and the other conventional methods is a very slow process and requires that excessive amounts of gumming or paste materials be used as means for sticking the skins to the plates to prevent the skins from dropping off. This obviously means more work in finishing the skins to bring back their proper texture and to get rid of the excess paste or gum. Furthermore, the skins thus treated are excessively dry.

The present process is an entirely new approach to and solution of the problem of drying tanned leather (herein referred to as skins) whereby not only is a better product obtained but also a very significant increase in production is obtained, it being estimated that about thirty times as many skins can be processed as with the old process, in the same amount of time.

While our process has been found to be exceptionally well suited to treatment of chrome tanned leathers, it can also be used for other leathers, such as for example will stand a suitable boil test or can withstand the temperatures involved in our process. In our process, the leather being treated does not become hot or get burned, sometimes referred to in the trade as "cooked." Instead the leather comes through at a very moderate temperature and in a pliable condition and has a nice feel to the touch.

In our process, the leather skin, in this instance chrome tanned leather, as it normally comes out of the treating vat and after being wrung and set out as is customary in the trade, the leather being at room temperature of usually 50 to 80 degrees Fahrenheit, is pasted to a vertical supporting plate and the plate with the leather thereon is then moved into a first zone of a current of constantly moving heated air at a temperature ranging from 350 to 550 degrees Fahrenheit. At the same time as this sudden application of high temperature heat, we subject the leather also to a bombardment of infra-red rays, these rays and the heat being derived from an indirect flame from the burning of a gas. The supporting plate is preferably of a material such as enameled metal, stainless steel, or Monel metal, and has a reflecting and conducting surface. The treatment in this first zone takes place for a period of from two to five minutes. The plate with the leather thereon is then moved into a second zone of a moving current of air having a temperature range of from 200 to 300 degrees Fahrenheit for a period of from 3 to 7 minutes. The time of treatment varies with the thickness of the leather being treated and the most desirable time is easily determined from observation of the treated leather.

We are unaware as to the specific scientific reason for the fact that the leather dried by our process is neither burned nor damaged but instead is dried in a fraction of the usual time and with better results. Our theory is that there is a colloidal dispersion throughout the leather, of the fat liquor particles in the leather, caused by the sudden bombardment of infra-red rays in the high heat and the moving current of air, and that the fat liquor residue in the leather or the greasing materials, whichever one may prefer to call them, is driven outwardly away from the pasted surface to the outer surface of the leather or skin and is carried off by the current of moving air. The result in the leather appears to be a deep drying effect and yet there is sufficient moisture left to give the leather a proper texture and to avoid excessive drying with the bad results incident to such excessive removal of moisture. Our process is in effect a controlled removal of moisture or drying at high speed, a condition which has heretofore been unknown to the tanning and drying industry which to now has held to the belief that such leather would only be properly dried without injury through the very slow processes heretofore known.

Thus, our method provides the accelerated predrying of tanned leather, by the combined action of a superheated atmosphere, which results in the sudden raise of the temperature of the skins, by conduction and convection, and in the application to said skins of infra-red radiations with specific chemical and physical properties. Our process includes after an initial step of accelerated predrying, the step of conditioning the leather by passing it through an atmosphere of lower temperature and forced circulation of air, also at temperature higher than that of common use in the conventional methods.

This invention differs from known methods in that its initial step of accelerated predrying comprises factors of sudden temperature raise by conduction and convection to temperatures from 350 to 550 degrees Fahrenheit which are notably higher than the highest previously ever used, and by the simultaneous application with this temperature raise, of infra-red radiations, for their specific chemical and physical action, relative to the wave length of said radiations, which work on the leather resulting in a deep drying, setting of the skins' area, and a better distribution of the greasing materials or residual fat liquor.

The method herein disclosed also differs from known processes, in that its following steps of conditioning takes place by subjecting the skins in another section of the predrying device, to an atmosphere of forced air circulation at high temperature, also higher than any used in the conventional methods, but lower than that used in the previous step of the process.

The originality of the invention becomes apparent if it is considered that in none of the known processes the determining factors of the invention have been used, such as, the treatment of tanned leather by accelerated predrying through the sudden raise in its temperature, reaching temperatures of from 400 to 550 degrees Fahrenheit, never used heretofore; the application of radiant energy in the frequency of the infra-red, as specific means of obtaining a deep predrying of the skins, and of resultant specific chemical and physical action, and conditioning the skins by passing them through an atmosphere of lower temperature and forced air circulation; these factors used in combination and in a sequence that, if altered, results in failure to obtain the desired results.

The method herein disclosed also differs from known processes, in that none of the conventional methods heretofore used results in predrying tanned leather in a matter

of minutes instead of hours. Also, a notable reduction in the amount of needed gumming materials is another result of the process, signifying not only a saving in the overall cost of the product, but in a better quality of the same.

An object of the invention is to provide a method for the accelerated predrying of tanned leather, which notably reduces the time needed for said predrying from three or more hours to from seven to fifteen minutes.

Another object of the invention is to provide a method for the accelerated predrying of tanned leather, which effects a reduction of the amounts of gumming materials, since reducing the time of exposure of the skins to the action of the over heated air and partially predrying the skins by conduction eliminates the need for excessive gumming materials.

Another object of the invention is to provide a method for the accelerated predrying of tanned leather which includes the simultaneous use with the sudden raise of the skins' temperature of infra-red radiations, as specific means of deep predrying of the leather, and distribution of the greasing materials, not as a by-product of the generation and use of heat.

Another object of the invention is to provide a method for the accelerated predrying of tanned leather which comprises the step of conditioning the skins by their passage in an atmosphere of circulating air, wherein the temperature has also been considerably raised.

A further object of the invention is to provide a process for the accelerated predrying of tanned leather which results in a product of much better quality and appearance than those of the product resulting from known processes, said predrying process taking place in a much shorter time and at a reduced cost.

With the above and other objects in view, our invention consists in the arrangement, combination and details of construction disclosed in the drawings and specification, and then more particularly pointed out in the appended claim.

This application is a continuation in part of our copending application, Serial Number 256,211, filed November 14, 1951, now Patent No. 2,690,069, for Method and Device for the Continuous and Accelerated Predrying of Tanned Leather.

In the drawing:

Figure 1 is a diagrammatic plan view of a leather drying system constructed according to an embodiment of this invention.

Figure 2 is a side elevation partly broken away showing diagrammatically interior of the heating chambers embodied in this invention.

Referring to the drawing, the numeral **10** designates generally an endless monorail with which connected together pairs of leather supporting plates **11** are adapted to be movably engaged. The plates **11** are spaced apart at their inner side, and the plates **11** may be either manually or mechanically moved along the rail **10**.

A closed housing generally designated as **12** encompasses one run **13** of the rail **10** and is formed of upstanding sides **14** with hinged doors or closures **15** and **16** at each end of the housing **12**. The housing **12** is divided into a plurality of leather treating or drying chambers, one of these chambers being indicated by the numeral **17**. The chamber **17** is the initial heating chamber, and in this chamber there are a series of vertically disposed combined gas burners and infra-red ray generators **18** which are positioned on opposite sides of the housing **12** below the rail **10** in a position to confront the opposite sides of the leather carriers **11**. The carriers or plates **11**, upon entering the housing **10**, may be mechanically moved by means of a chain **19** which is engaged by a hook **20** carried by the lower portion of the leather carrier **11**.

The generators **18** are adapted to produce a very high temperature ranging from 350 to 550 degrees Fahrenheit

so as to produce on the skins a thermic shock and a sudden rise in their temperature by conduction induced by intimate contact with the supporting plates and by convection in the displacement of the overheating air masses in the chamber **17**. The convection heating is controlled by forced circulation of air produced by a suction blower **21** which has the outlet side thereof connected to upper air discharge pipes **22** and **23** positioned on opposite sides of the rail **10**. The intake side of the suction blower **21** is connected to lower suction or intake pipes **24** positioned in the lower portion of the housing **12** so that a relatively even heat distribution will be produced throughout the initial drying chamber **17**.

The skins which are adhesively secured to the carriers **11** are also subjected to infra-red radiations in chamber **17** so as to thereby produce a deep predrying of the skins and an adequate distribution of the inherent greasing materials. The skins are positioned within the initial drying chamber **17** for a period of from two to five minutes, which time is sufficient to obtain an adequate dehydration of the skins, a setting of their area and a distribution of their greasing materials.

The second step in the drying of the skins comprises the moving of the carriers with the skins adhered thereto into a conditioning chamber **25** which communicates at its rear end with the forward end of chamber **17**. The chamber **25** is substantially longer in length than the chamber **17** so that the skins will be subjected to a longer conditioning period and at the same time, the temperature of the air is reduced. The reduction in the air temperature is accomplished by means of one or more suction blowers **26**, which have their suction sides **27** extended into the upper forward portion of chamber **17**. The blower or outlet sides of the suction blowers **26** are connected to upper discharge manifolds or pipes **27**, which extend along the length of the upper portion of conditioning chamber **25**. The temperature of the air in conditioning chamber **25** will range from 200 to 300 degrees Fahrenheit.

The skins are positioned in the conditioning chamber **25** for a period of from three to seven minutes, the time of treatment in the conditioning chamber varying with the thickness of the leather treated. When the carriers, with the skins, are moved out of the forward end of housing **12**, the skins may be peeled or otherwise removed from the plates forming the carriers **11** and at this time, the skins will be in a relatively pliable condition with sufficient moisture remaining in the skins to give the leather a proper texture.

Wth the process hereinbefore described, the product is a skin of better appearance and better quality. This process also results in a very substantial reduction in the amount of gumming materials necessary to adhere the skins to the carrier plates, and a more uniform predrying of the skins is obtained.

We do not mean to confine ourselves to the exact details of construction herein disclosed, but claim all variations falling within the purview of the appended claim.

What is claimed is:

An apparatus for drying and conditioning leather comprising first and second chambers arranged one immediately adjacent the other, an endless track extending through said chambers, in one direction the return side of said track being exterior of said chambers, a plurality of hide supporting plates suspended from said track, said plates being adapted for the reception of a hide on each side thereof, a series of vertically disposed air heating elements in said first chamber, a plurality of suction fans in said second chamber for reducing the heat transmitted in the first chamber to the hides under treatment, said second chamber being substantially longer than said first chamber, a forced air circulation blower communicating with said first chamber, and a series of air inlet pipes along the floor of said first chamber connecting with the

intake of the blower for circulating heated air through said first chamber, the outlet for said blower extending along the top of said first chamber.

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