United States Patent

Gould

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[54] APPARATUS AND PROCESS FOR TREATING HIDES

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[52] **U.S. Cl.** **69/30**

[51] **Int. Cl.** **C14c 15/00**

[58] **Field of Search** 69/30, 29, 32; 259/175, 176, 259/177, 81, 89, 90, 30; 68/142

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[57] **ABSTRACT**

The hide-processing apparatus is comprised of a rotatable and axially inclined drum having two helical T-shaped blades fixed to its inside wall. The web of each blade is perforated. In treatment of hide, the drum is partially filled with a processing solution and with hide. Upon rotation of the drum in a tumbling direction, the hide is dehaired by being worked upon by the rotating blade and the removed hair is moved in an opposite direction to the movement of the hide and towards the open end of the drum. Upon rotation of the drum in a discharging direction, the treated hides are discharged through the loading end, yet, because of the perforations, most of the hide-treating liquid is retained in the drum during the discharging phase.

3 Claims, 3 Drawing Figures

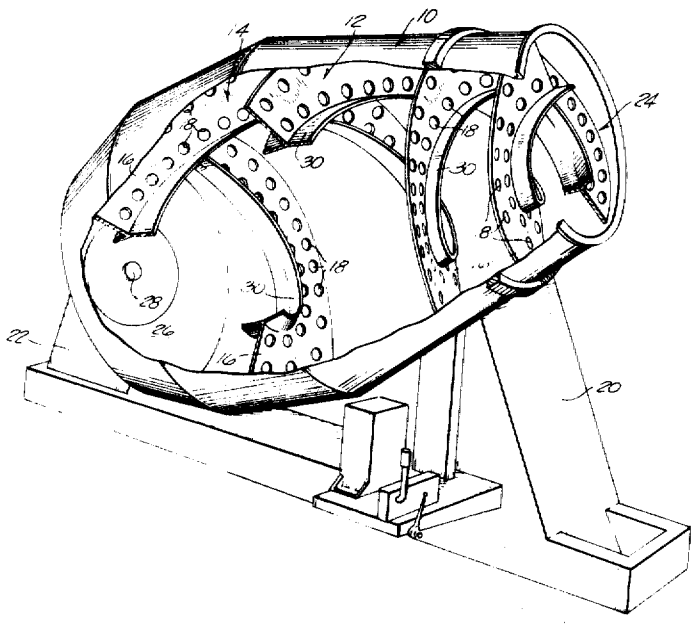


Fig. 1

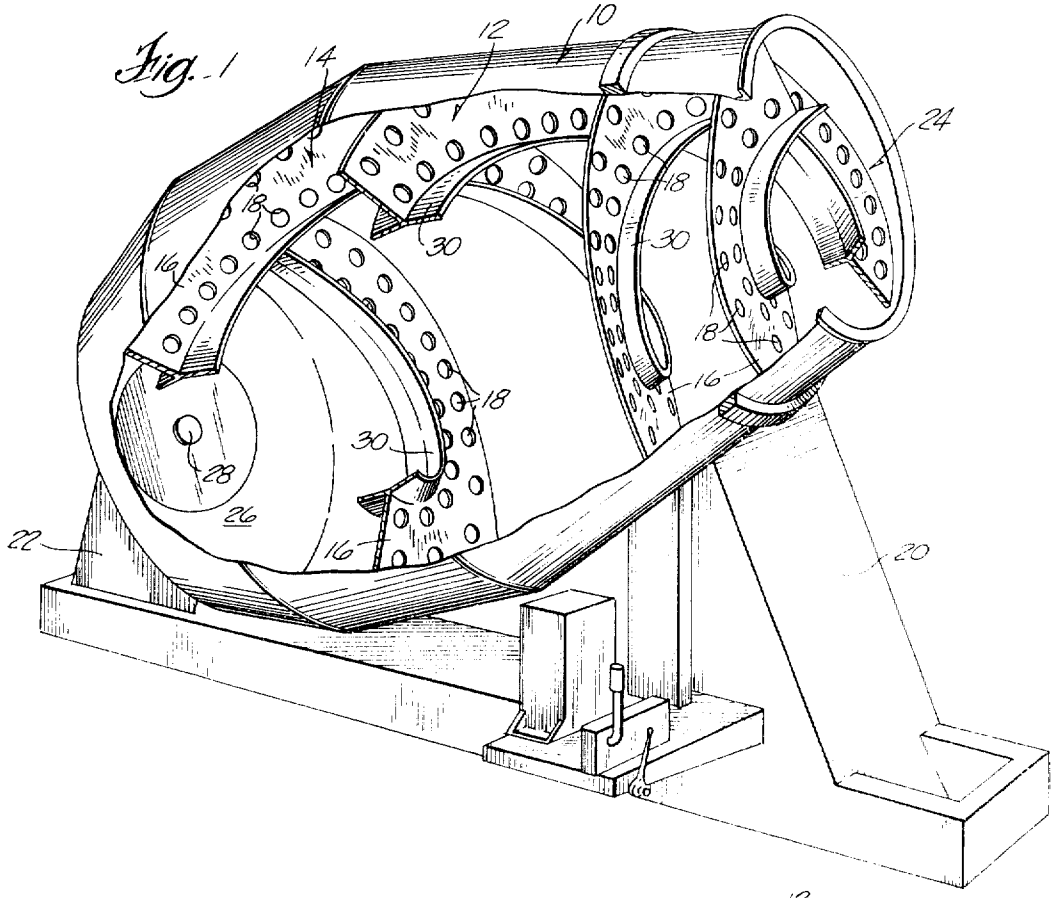


Fig. 2

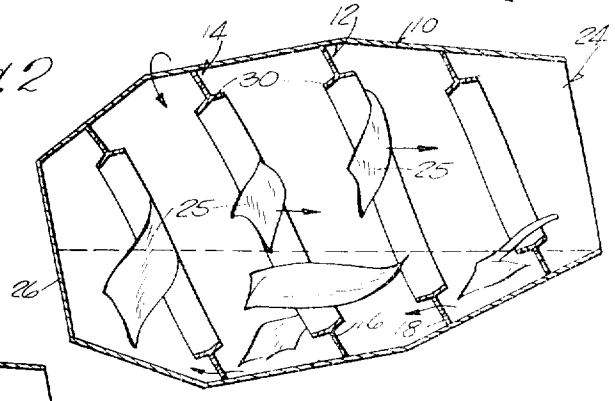
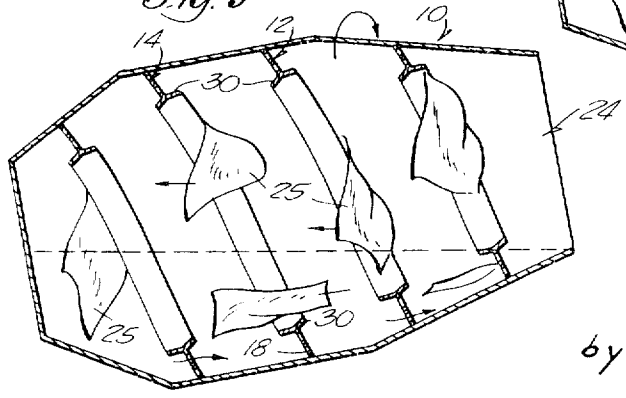


Fig. 3



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APPARATUS AND PROCESS FOR TREATING HIDES

BACKGROUND OF INVENTION

1. Field of Invention

The field of invention may be defined as the dehairing and further processing of hides by agitating the same in a processing solution by helical blades.

2. Description of the Prior Art.

The processing of hides from the untreated stage through the final stages of tanning has usually involved the successive agitation or tumbling of the hides in dehairing, tanning and other processing solutions, with the agitation being provided by movable blades which are immersed in the solution. Prior to the present invention, blade designs as such were not concerned with the removal of hair from the treatment bath and, in general, the sole function of the blade was to impart some motion to the immersed hides within the bath.

SUMMARY OF INVENTION

The concept underlying the present invention is to provide a blade design which will cause a distinct counterflow of the processing solution in respect to movement of the hides within the bath. A counterflow of this type will permit the removed hair and other small particles to be conveyed to one end of the bath where they can be removed by overflow or other known means. Also, a design of this type permits the use of the blades in discharge of the treated hides from the bath, yet, minimizes the removal of significant amounts of the treating solution during the discharge phase.

The desired counterflow is achieved by providing one or more perforated helical blades which are rotated within the solution bath. The rotation of the perforated blades will tumble the hides within the solution and cause them to be gradually moved towards one end of the bath. However, because of the perforations, the rotation of the blades will create a strong counterflow of the solution at each immersed perforation, with the counterflow carrying removed hair and other small particles towards the other end of the bath where they can be removed. The counterflow has the further advantage of providing direct impingement of the solution on those portions of the hide which might be in direct contact with the blade surface and, thus, assures that all portions of each hide are subjected to substantially equal exposure to the solution.

The blade design may be further improved by utilizing a cross-sectionally T-shaped blade which, because of the cross-member, intensifies the flow through the perforations and, thus, further increases the flow of the removed hair as well as the impingement of the solution on the hides.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the hide-treating apparatus with portions being broken away to show the blade design;

FIG. 2 is a schematic cross-sectional side view of the apparatus illustrating the flow pattern during rotation of the drum in a discharging direction with arrows indicating the normal hide movement and the counterflow at the perforations of the blades; and

FIG. 3 is a similar schematic cross-sectional side view of the apparatus illustrating the flow pattern during rotation of the drum in a charging direction.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The illustrated hide-processing apparatus is comprised of a rotatable drum **10** which is provided with two internal helical blades **12** and **14** which are attached to the inside wall of the drum. The blades are T-shaped in cross section and their webs **16** are provided with perforations **18**.

The drum is maintained on an inclined axis by supports **20** and **22** and a suitable motor (not shown) is provided to permit the drum to be rotated in a charging direction (clockwise in the drawings) and in an opposite discharging direction (counterclockwise in the drawings). When the drum is rotated in the charging direction, the helical blades will convey material within the drum from the drum opening **24** towards the drum bottom **26**. Upon drum rotation in the discharging direction, the blades will tend to move the material within the drum towards the drum opening **24**.

At the beginning of the hide-processing operation the drum is filled through a charging port **28** with an appropriate processing solution to a level somewhat below the lower rim of the opening **24**. In most cases the initial solution is brine which, upon agitation of the hides, works to dehair the hides. In subsequent steps of the operation the drum may be charged with a liming solution which serves to further dehair the hides, and with suitable pickling and tanning solutions which serve to further process the hides to a tanned state. During the dehairing steps the removed hair and other organic matter remain suspended in the processing solution for some time, but in absence of proper agitation of the solution or removal of the matter it normally would tend to settle and accumulate at the bottom of the processing vessel.

After the drum has been filled with a solution, the drum is rotated in the charging direction and the hides **25** are introduced through opening **24**. Because of the helix of the blades, such rotation will cause the hides to be tumbled in a somewhat spiral path and to be, thus, gradually moved towards the bottom end of the drum where the tumbling is continued for an appropriate length of time. Such rotation of the drum will, of course, also cause the blades to move in a downward direction in respect to the processing solution. In absence of the perforations **18**, such rotation of the blade would impart a somewhat loop-shaped, although quite turbulent, flow to the solution with the flow of the solution between the drum wall and top of the blades being generally towards the bottom of the drum where the flow would reverse direction and return towards the top of the drum at a level just above the blades. A loop-shaped flow path is undesirable because at its point of 180° change of direction at the bottom of the drum the hair and other matter which are carried by the solution are subjected to centrifugal forces which cause such matter to be deposited and compacted at the bottom corners of the drum.

The perforations **18** of the blade substantially eliminate the loop-shaped flow path because they provide a backwards flow in respect to blade movement at each perforation. The flow is sufficiently strong to carry the suspended hair and other matter through the perforations in a direction opposite to the blade movement. Since the suspended matter is repeatedly subjected to forced flow through successive perforations, the matter gradually works its way towards the open end of the drum where it may either be skimmed off or removed by an overflow or similar means. The intensity of the flow through the perforations is increased by the cross-members **30** of the blades which block some of the upward components of the flow and, thus, increase the force which acts on the solution at each perforation.

In discharging of the drum, the direction of the drum's rotation is reversed and the processed hides are moved by the blades towards and through the opening **24**. During this time, the perforations **20** cause substantial counterflow of the processing solution in respect to the blade movement and, thus, minimize the amount of solution which would normally be lost during the discharging step.

I claim:

1. Hide-processing apparatus for agitating hides in a liquid processing solution, comprising:

an axially inclined vessel having an opening at its upper end;

helical blade means fixed to the inside wall of said vessel and extending to the edge of said opening;

motor means to rotate said vessel around its inclined axis in a charging direction during which said helical blade means move the hides in a direction towards the bottom section of said vessel, and to rotate said vessel in a discharging direction (opposite to said charging

direction) during which said hides are moved by said helical blade means towards and out said opening; and

perforations in said helical blade means extending substantially for the entire length of said helical blade means and allowing a counterflow of said solution through such perforations in a direction opposite to the effective blade movement in the solution.

2. Hide-processing apparatus according to claim 1 wherein said blade means is comprised of a web section which extends radially inwardly in respect to said vessel and a cross-member fixed to the inner end of said web section; and wherein said perforations are in said web section, thus, causing said cross-member, upon rotation of said vessel, to block the upwardly component of solution flow and to thereby increase the counterflow producing force which acts on the solution at said perforations.

3. Hide-processing apparatus according to claim 2 wherein said web and cross-member provide a T-shaped cross-sectional contour to said blade means and, thus, cause said cross-member to increase said counterflow producing force upon rotation of said vessel in either direction.

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