

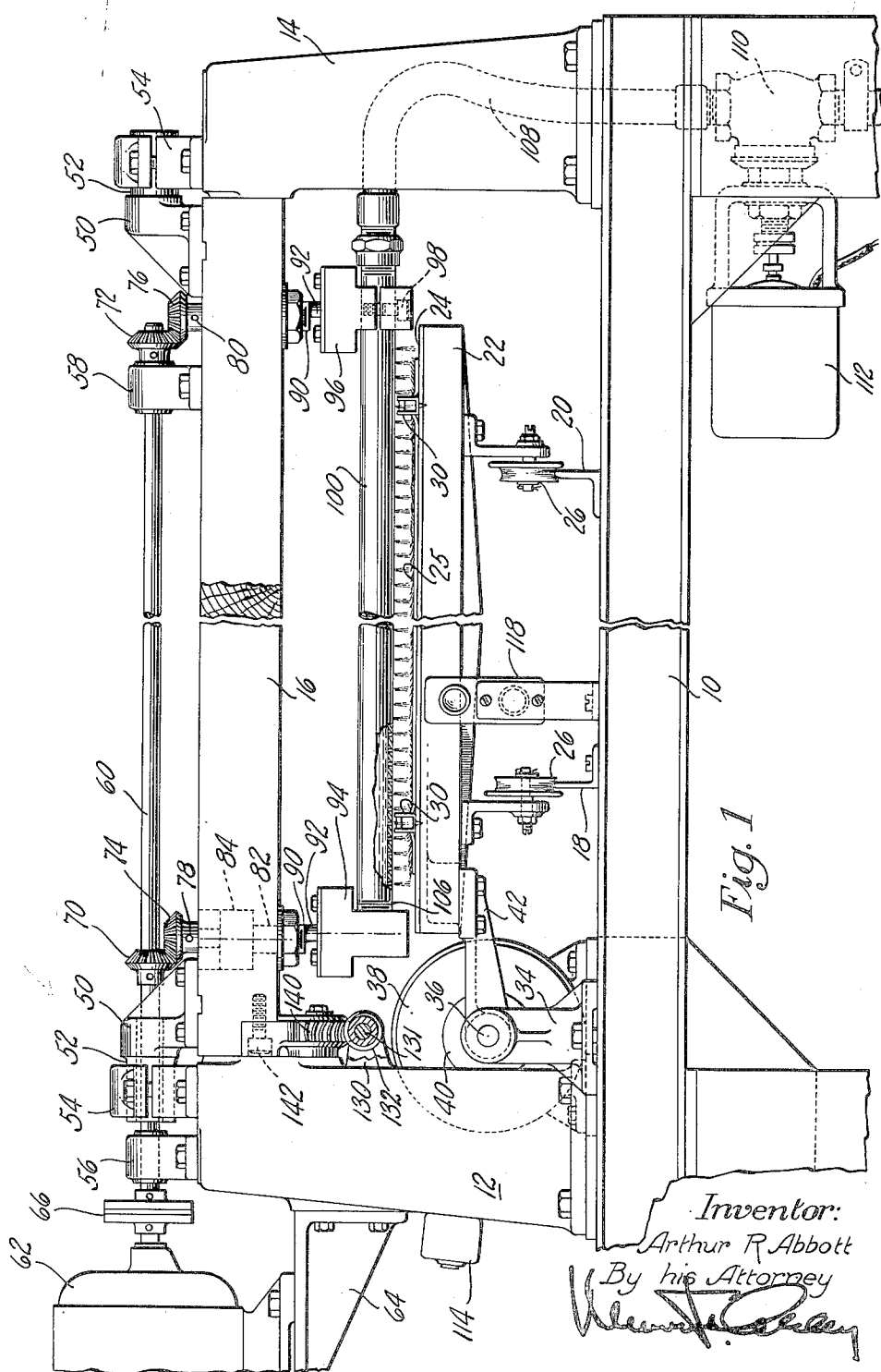
Dec. 23, 1952

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MACHINE FOR TREATING HIDES BY APPLICATION
OF PRESSURE FROM DIVERSE DIRECTIONS

2,622,428

Filed April 6, 1949

3 Sheets-Sheet 1



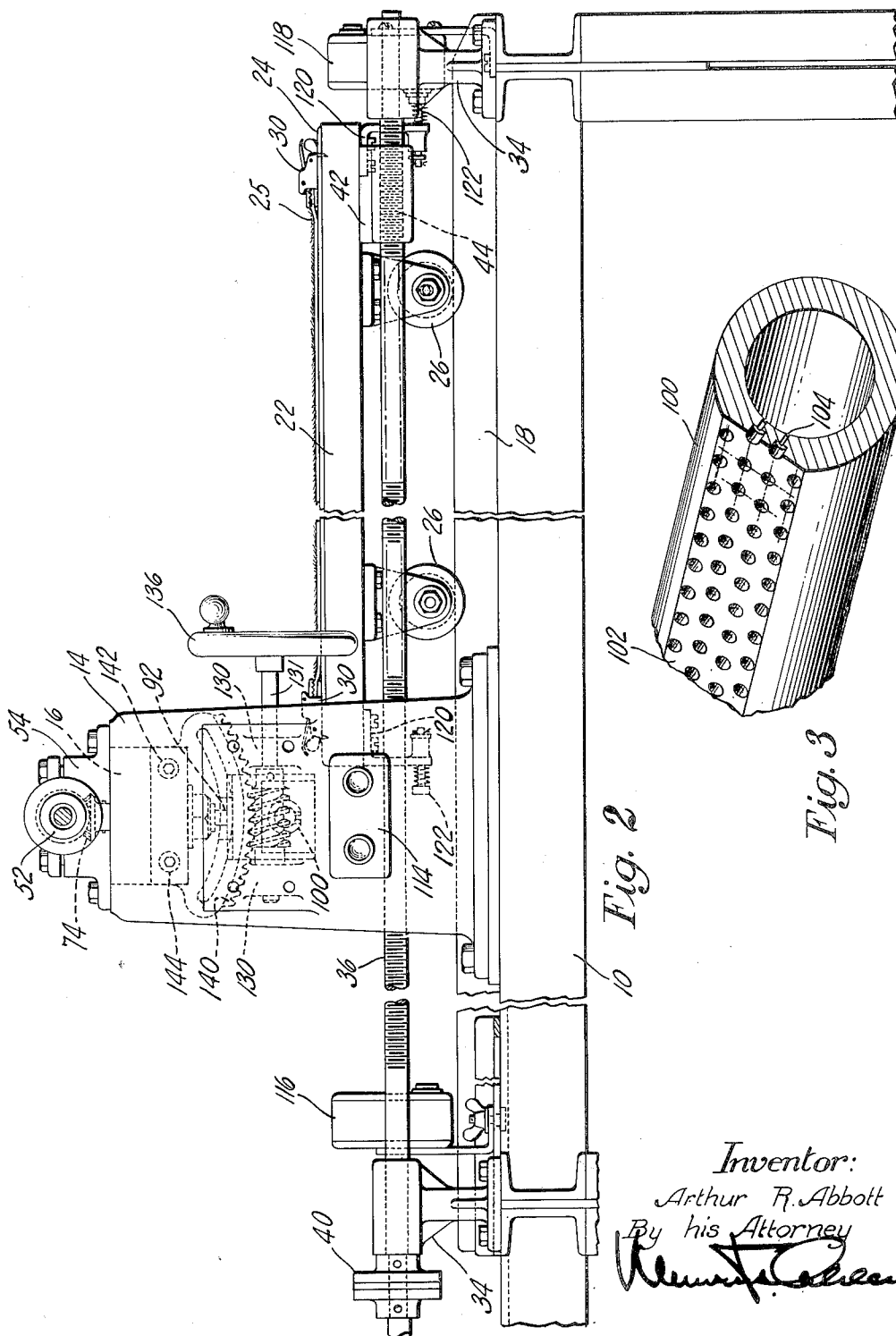
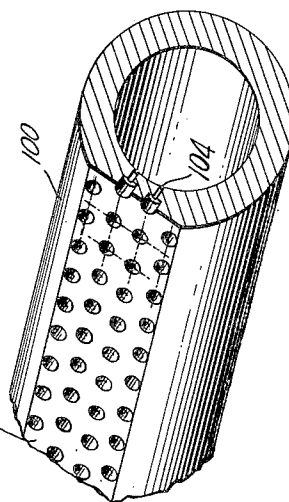
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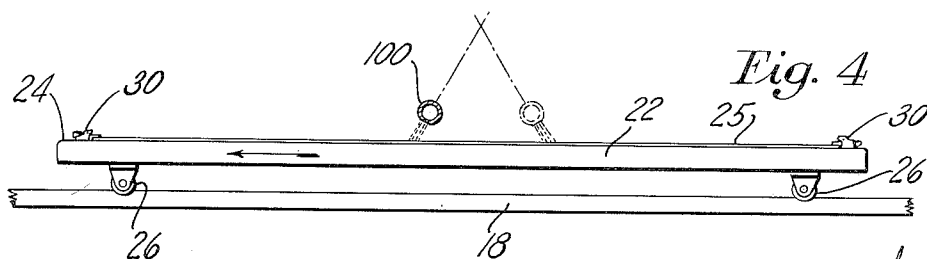


Fig. 4

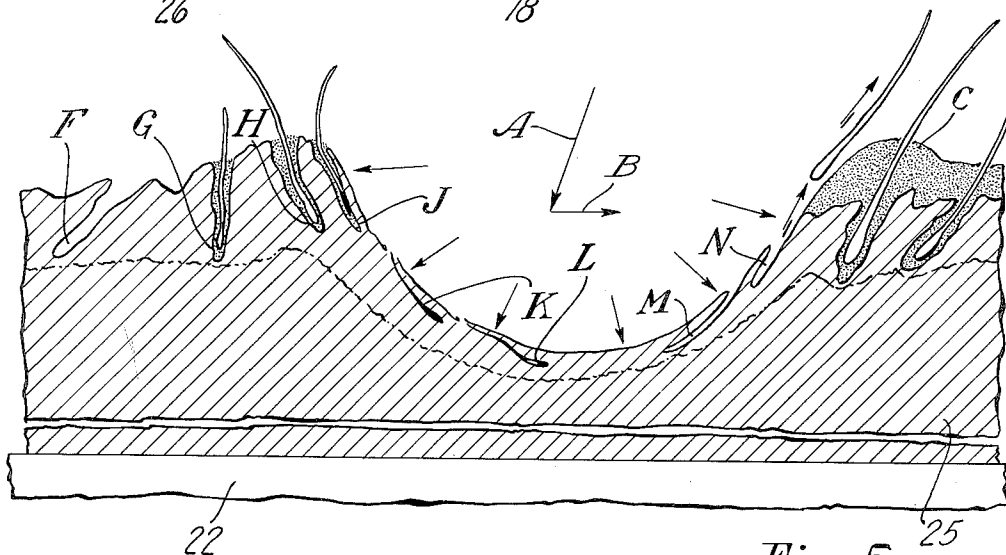


Fig. 5

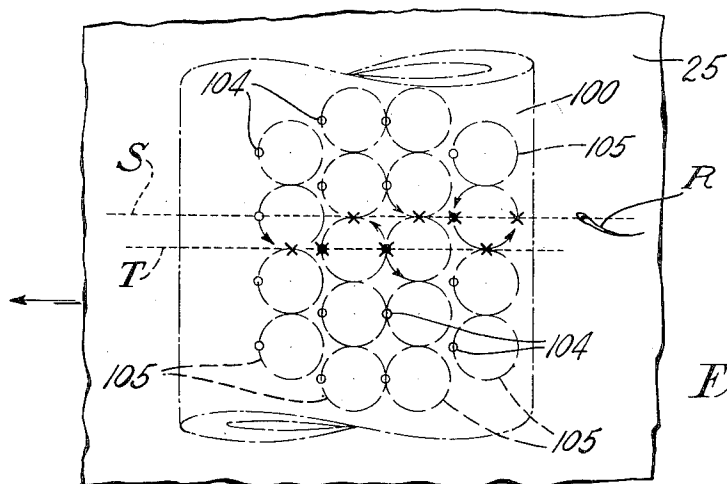


Fig. 6

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UNITED STATES PATENT OFFICE

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MACHINE FOR TREATING HIDES BY APPLICATION OF PRESSURE FROM DIVERSE DIRECTIONS

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6 Claims. (Cl. 69—32)

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This invention relates to machines for treating hides, and more particularly to machines involving the successive application of localized pressure from diverse directions on small areas of the surface of a given hide to remove hair, scud or flesh. It is to be understood that the invention is not limited to use of any particular machine and/or apparatus.

When the term "hides" is used alone herein it is the intention to refer to either hides or skins. The use of that term avoids excess verbiage.

In customary beamhouse operations, the raw stock is washed, soaked, rough fleshed, limed, unhaired and fleshed again. Other operations are also carried out to prepare the stock for subsequent tanning. The liming operation may take one of many forms and may be substituted by a putrefaction step but its purpose is to loosen the hair from the hair follicles after which the hair may be removed by machine or by hand. After unhairing it is customary to perform a scudding operation as the hair follicles tenaciously retain the scud which comprises remnants of epithelial tissues, hair pigment, glands and lime soaps. Scudding may be done by machine but better work is performed when it is done by hand. The hand operation, however, involves considerable labor and time and is unpleasant to perform. Heretofore, scudding by machine or by hand has necessitated the use of a wood or metal knife or blade for scraping the work.

The fleshing operation is conventionally carried out in conjunction with one or more soakings as contact with water restores the hide fibers to their normal sizes and shapes and the fleshing may therefore be performed for uniform results. Fleshing is usually done by a rotating spirally bladed cylinder pressed against the flesh side of a hide, the latter being backed by a rubber roll. The blades cut away the areolar tissues that make up the flesh of the skin. The washing or soaking time is considerable and much handling of each hide has heretofore been required.

There have been attempts to use water jets for removing hair from hides. Such attempts have heretofore not proven successful. A row of jets impinging upon a work piece will not do the work satisfactorily as streaks of hair, etc. are left on the hide between the lines of fluid contact. A water knife—i. e., water issuing from a stationary slot—also will not perform the operation as desired for it leaves many of the fine hairs and other matter still adhering to the skin.

It is an object of the present invention to provide a machine for treating hides whereby each

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work piece may be cleared of hair, scud, flesh, or other matter with a minimum of skill necessary on the part of the operator and the securing of uniformity of treatment and improved quality of the work.

To these ends, and in accordance with important features of the invention, a backing member is provided for a spread-out hide and a device for successively applying pressure on small areas of the hide is located adjacent to the backing member. This pressure applying device may conveniently be in the form of a spraying device for directing jets of fluid such as water or air against a work piece placed with its flesh side in contact with the backing member (for unhairing) and with its grain or hair side in contact with the backing member (for fleshing). The backing member and the pressure applying device are moved relatively so that the areas of pressure application or impingement of fluid from the spouts or vents of that device approach or traverse any given spot on the hide from diverse directions and preferably from four directions.

These and other important aspects and features of the invention and novel combinations of parts will now be described in detail and then pointed out more particularly in the appended claims.

In the drawings,

Fig. 1 is a view in end elevation of a machine embodying features of the present invention;

Fig. 2 is a view in front elevation of the machine shown in Fig. 1, but with the motors and motor supports omitted;

Fig. 3 is a perspective view, drawn to an enlarged scale, of a portion of the pressure applying or spraying device shown in Fig. 1;

Fig. 4 is a view in elevation of the work supporting member and showing its relation to the spraying device;

Fig. 5 is a greatly enlarged sectional view of a hide at an area of pressure application or fluid contact; and

Fig. 6 is a diagrammatic showing illustrating the principle of operation utilized in carrying out the invention.

The particular embodiment of the machine illustrated is designed to be attached to, and to stand upon, a platform 10 constructed of I-beams and channel bars. The machine includes two main standards 12 and 14 bolted to the platform 10 and between which a wood beam 16 is horizontally suspended for oscillation or tilting. Angle bars 18 and 20 are arranged

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on the platform 10 to serve as tracks or rails for a carriage 22 which is adapted to move from one end of the machine to the other below the beam 16 and between the two standards 12 and 14. The carriage 22 is provided with a horizontal supporting surface 24 for a work piece 25 to be treated. The carriage is borne on conventional flanged wheels 23. Each end of the carriage 22 is provided with work holding and stretching clamps 30 attached thereto or, preferably, hooked thereto. Such clamps are conventionally used to hold hides on drying frames. Two brackets 34 (Fig. 2) are attached to the platform 10 and serve as journals for a threaded shaft 36 running the length of the machine. A motor 38 (Fig. 1) is also mounted on the platform 10 and is connected by means of a coupling 40 to one end of the shaft 36. A horizontal bracket 42 is bolted to the under side of the table or platform 22 and is threaded at 44 for the reception of the threaded portion of the rod 36. The horizontal beam 16 is provided with two brackets 50 (Fig. 1) bolted to the opposite ends thereof and these brackets are each provided with an extension 52 which serves as a trunnion within a two-part journal 54 attached to the top of a standard 12 or 14. A journal block 56 (Fig. 1) is bolted to the top of the standard 12 with its bearing coaxial with the trunnion extensions 52. A journal block 58 (Fig. 1) is bolted to the top of the beam 16 and a shaft 60 is supported in the two journal blocks 56 and 58 and passes through one of the extension trunnions 52. A motor 62 (Fig. 1) is mounted on a support bracket 64 bolted to the front of the machine—that is—to the standard 12. The shaft of the motor 62 is connected to the shaft 60 by means of a coupling 66. Bevel gears 70 and 72 are pinned to the shaft 60 at the points indicated in Fig. 1 and are respectively in mesh with bevel gears 74 and 76. The latter gears are pinned at 78 and 80 respectively to vertical shafts passing down through the beam 16. Only one of these shafts 82 is shown but they are similar and rotate in suitable and conventional bearings 84 (one shown—Fig. 1) which retain them in position against thrusts exerted in both vertical and horizontal directions. The lower end of each of these two vertical shafts (such as shaft 82) is rigidly locked to a member 90 having a downwardly directed and eccentric shaft or crank 92.

The eccentric shaft 92 nearest to the front of the machine is journaled in a one-piece block 94 utilizing a bearing which permits the shaft 92 to support the block 94 against the force of gravity. The specific form of bearing is not illustrated as it forms no part of the invention. The other shaft or crank 92 is similarly journaled but in place of a one-piece block 94 a split block 96 is used. This block 96 is split into two parts which are bolted together by means of bolts 98 to support one end of a pressure applying or spraying device 100 between them. This spraying device is in the form of a pipe with a flat under surface 102 (Fig. 3) bearing spouts or vents 104 which are preferably arranged in four parallel rows extending across, over and substantially parallel with the surface 24. The two inner rows of spouts are offset or staggered with relation to the outer rows. The end of the spraying device 100 nearest the front of the machine is threaded at 106 for firm attachment with the block 94. The other or rear end of the spraying device 100 is connected by means

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of a conduit 108 to a solenoid operated valve 110 and leads to a source of fluid pressure not shown. The solenoid 112 and its valve 110 is a commercial product.

A control switch box 114 with two push buttons is attached to the front of the standard 12 and is used for controlling the circuits leading to the motors 38 and 62 as well as to the solenoid 112. A single push button control box 116 is supported on the left end of the platform 10 as viewed in Fig. 2. A two-push-button control box 118 is mounted on the right-hand end of the platform 10 as viewed in Fig. 2. A bracket 120 (Fig. 2) is suspended from each end of the carriage 22 and each bracket supports a spring-pressed plunger 122 which is in alignment with the single push button of box 116 and the lower push button of box 118.

The electrical circuits are not shown in the drawings as they do not form a part of the present invention and the provision of suitable circuits is easily within the ability of any person skilled in electrical wiring technique. The requirements for the circuits may be varied but one mode of operation is set forth hereinafter.

The rear side of the standard 12, or right side as viewed in Fig. 1, is provided with ears 130 (Fig. 2) between which is mounted and in which is journaled a shaft 131 for a worm gear 132. The gear 132 is keyed to the shaft 131 and one end of the latter is keyed to a hand wheel 136. A gear segment 140 is bolted at 142 and 144 to one end of the beam 16 and the teeth thereof are in mesh with the worm gear 132.

The removal of hair and scud in the past has been done better by hand than by machine as the hand operator visually observes the effectiveness of his knife strokes and modifies them accordingly. The hair follicles slope in many directions and this may be the reason why he has found that varying the pressure and direction of his strokes improves the quality of the work done. Whether this reason be correct or not, it would appear that if a machine were devised in the operation of which every follicle in a given hide were subjected to a squeezing action progressing from its root to its mouth, all follicles of that hide would be cleared of scud and hair. It is apparent that a squeezing action exerted from the mouth or opening of each follicle and progressing to its root would be of non-effect—it would cause the hair and scud to be trapped within the follicle. The hand operation of scudding is necessarily preceded by an unhairing operation and does not employ the principle of uniform treatment or squeezing action over the entire surface of a hide. Hand scudding must be carried on by a skilled operator as he must visually observe the results of his knife action and vary his strokes to secure optimum results. The strokes are effective on narrow areas of the hide and, at best, the results of hand scudding are spotty and irregular because of the nature of the operation. Machines also, as heretofore constructed, do not take advantage of the fact that all follicles of a given hide may be divested of both hair and scud in one operation in which the follicle squeezing action is uniformly applied. The machine of the present invention effects this uniform action despite the widely diverse directions in which the follicles extend in any hide.

Fig. 5 illustrates the action which apparently occurs in carrying out principles involved in the present invention (as applied for unhairing) using water as the pressure applying medium and

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assuming that the jet or fluid is impinging against the hide and approaching the latter at an angle illustrated by the arrow A. It is also assumed that the spout or vent for the jet or the area of impingement on the hide is moved linearly and with respect to the hide 25 in the direction of the arrow B—i. e.—the left-hand portion of the hide in Fig. 5 has been treated and the right-hand portion has not yet been subjected to treatment. The force of the fluid is such as momentarily to form a slight lip or ridge C at the edge of the small depression or dimple caused by the jet. It will be easily understood that a follicle such as the follicle F is easily divested of its hair and scud for that follicle is first squeezed at its root as the area of jet impingement moves (arrow B) whereas a follicle such as follicles G, H and J tends to close and entrap the material within it. The specific angle of the jet or line of general pressure application with respect to the work is of slight importance compared with the direction of motion of the spout or its fluid impact area on the work as shown by the arrow B. Because of the motion in the single direction of arrow B, follicles K and L close to trap their contents while follicles M and N are made to open and disgorge theirs. Follicles with an inclination (greater than that of arrow A) such as that of follicle F are completely divested of their contents when they are approached or traversed by the area of fluid impingement as it moves in the direction of the arrow B. If each follicle is approached or traversed from diverse directions (preferably from each of four quadrants), all follicles will be cleared of their hair and scud as each follicle is at some time subjected to a squeezing action beginning at its root even though that follicle, at other times, constitutes a trap for its contents.

In operating the machine for unhairing and scudding, a hide 25 is spread out upon the surface 24 of the carriage 22 flesh side down and is held in "spread-out" condition by means of the clamps 39. The switch in box 114 is then operated to start the motor 62 with the result that the spraying device 100 moves rapidly in a horizontal plane because of the action of the eccentric shafts 92. The top button in the switch box 118 is then depressed with the result that the solenoid-actuated valve 110 is opened to permit fluid (water in this instance) under pressure to enter the spraying device 100 and be ejected downwardly. The depression of the push button in box 118 is also caused to start the motor 38 and the moving of the carriage 22 from its position as shown in Fig. 2 toward the left-hand end of the machine as shown in that figure. As the carriage 22 proceeds to the left, the jets from the spouts 104 are inclined to the left as shown in full in Fig. 4. This causes the jets to impinge against the work piece 25 and flow off the leading edge of the work piece. As the carriage proceeds the hand wheel 136 is turned to tilt the beam 16, and the right-hand edge or trailing end of the work piece 25 is treated with the jets inclined downwardly and toward the right, as indicated by the position of the spraying device shown in the dot-and-dash lines of Fig. 4. Varying the inclination of the jets with respect to the work is not essential but it is preferred as it minimizes the strong tendency for the fluid to sweep the work piece off the carriage. When the carriage has reached the left-hand limit of its travel the spring-pressed plunger 122 strikes the push button of the box 116 and the electrical circuits are such that the motor 38 is reversed. The carriage 22 then returns to the

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position shown in Fig. 2 and the plunger 122 serves to actuate the lower push button in the box 118 to stop the motor 38 and to close the valve 110.

As set forth above, Fig. 5 illustrates what occurs when a given spot on a work piece or a follicle is approached or traversed from only one direction by the pressure or fluid impact area. The illustrated machine is so constructed that such spot or follicle is approached and traversed from at least four directions. As already stated, when all follicles of a work piece are so treated then that piece is uniformly cleared of all hair and scud.

Fig. 6 illustrates the principle of operation as applied for four-directional approach or traverse of each follicle by the pressure area. The spraying device 100 is provided with four rows of spouts or vents 104 extending over and across the carriage surface 24. The two inner rows are staggered or offset with respect to the two outer rows. Two staggered rows instead of the four as shown may be used. The circles 105 of Fig. 6 represent the paths of the individual vents 104 as they rotate because of the action of the eccentric shafts or cranks 92. The diameter of each of the circles 105 is preferably about .125" although a diameter of .5" has proven successful. Any point selected on the pressure applying or spraying device 100 is rotated at 4000 R. P. M. but this speed may be varied to suit given conditions. One vent 104 is shown for each circle 105. It will be understood that more than one may be used for each circular path and they may be arranged radially in each circle or circumferentially.

The diameter of each jet orifice or vent 104 is .02" (diameter of a #76 twist drill) to give a $\frac{1}{16}$ " diameter dimple in the work placed $\frac{7}{8}$ " away from the vent. A change in the vent size will, of course, modify the other conditions. A .02" diameter vent as referred to above will produce a dimple with a diameter of about $\frac{1}{8}$ ". Proper unhairing action occurs at the dimple area and also around that area but scudding occurs only at the dimple area. From this it may be seen that the vents should be of such diameters and they should be so revolved, if scudding action is desired, that all portions of the area of a work piece being treated should come within a dimple area at least four times and from diverse directions. The four directions are preferably at right angles to each other but may be at other angles if desired.

The speed or travel of the carriage 22 is such as to bear a definite relationship to the motion of the spraying device 100 or spouts 104. Assuming that D represents the diameter of a circle 105 (Fig. 6) and also the distance traveled in a given time by the carriage 22, then the minimum circumferential distance simultaneously traveled by each spout 104 is

$$\frac{\pi D}{2}$$

With such relative motions of the spouts and carriage (or work) a follicle R (Fig. 6), when moving along the path S at a speed of D feet per minute will be contacted four times and from four directions at the four points marked X. Another follicle will be contacted at the four points marked X as it travels along the line marked T. If the dimple area is made large enough (by proper selection of vent size and jet length before impact) and the circles 105 are made sufficiently small, all area of a given work piece is subjected to scudding as well as unhair-

ing action. The revolutions per minute of the spouts or vents 104 may be increased but obviously should not be reduced beyond a given minimum for a given rate of feed.

For fleshing, the same apparatus may be used and the method of operation is the same except that the hide is placed with its hair or grain side against the backing member or supporting surface 24. Approach of each spot from diverse directions and preferably from four directions by the areas of applied pressure or fluid impingement results in uniformity of treatment and a velvety surface for the work piece. The usual preliminary soaking operation (necessary for conventional fleshing) may be reduced in its extent and in some cases may be eliminated entirely.

Water is preferred as the pressure applying medium and a pressure of from 500 to 600 pounds per square inch within the conduit 108 has been found suitable. Other pressures may be used depending upon the type of work to be done. At a pressure of 300 pounds per square inch, the unhairing and scudding is well done but the quantity of water used is increased considerably for the proper treatment of each hide. Air is an acceptable fluid for applying pressure in some cases and has been used with a pressure of about 80 pounds per square inch. It has a tendency to dry the hide out, however.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A hide treating machine including a supporting member for a spread-out work piece, a fluid spraying device adjacent to said member with rows of spouts directed toward said member, means for continuously moving the spouts in endless paths, and means for moving said supporting member in a plane transverse to the line of fluid ejection from each spout.

2. A hide treating machine including a member with a supporting surface in a given plane for a spread-out work piece, a fluid spraying device adjacent to said member with spouts directed toward said member, means for rotating the spouts of said spraying device in a plane substantially parallel with said member, and means for moving said member in said given plane.

3. A hide treating machine for removing hair and scud from hides in which the hair is loose in the hair follicles including a member with a surface for backing up a spread-out work piece, means for retaining a work piece in position with its flesh side in contact with said surface,

means for moving said surface in a given path, a fluid spraying device mounted adjacent and substantially parallel to said surface with rows of spouts extending across said path and each spout being directed toward said surface, and means for bodily rotating said spouts, the said surface moving means and spout rotating means being arranged to cooperate so that the areas of impingement of fluid from the spouts contact spots on said surface or work piece from divers directions.

4. A hide treating machine as set forth in claim 3 including means for turning said spraying device and inclining the spouts with respect to the work piece.

5. A hide treating machine including a member with a supporting area for a spread-out work piece, adjacent rows of fluid discharge spouts arranged with each spout being permanently directed toward and terminating close to said area, means for continuously moving the spouts in endless paths, and means for moving the said member and spouts relatively so as to cause a given point on said area or work piece to be approached from each of at least four directions in succession by impact areas of fluid ejected from said spouts.

6. A hide treating machine including a member with a supporting area for a spread-out work piece, a group of fluid discharge spouts extending adjacent and across said area, each spout being permanently directed toward said area, means for continuously moving the spouts in endless paths, and means for moving the spouts and member relatively to cause areas directly affected by jets from said spouts to overlap.

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