W. H. Rosensteel,

Tanning Apparatus.

No. 7089. Patented Feb. 12, 1850

Fig. 1.

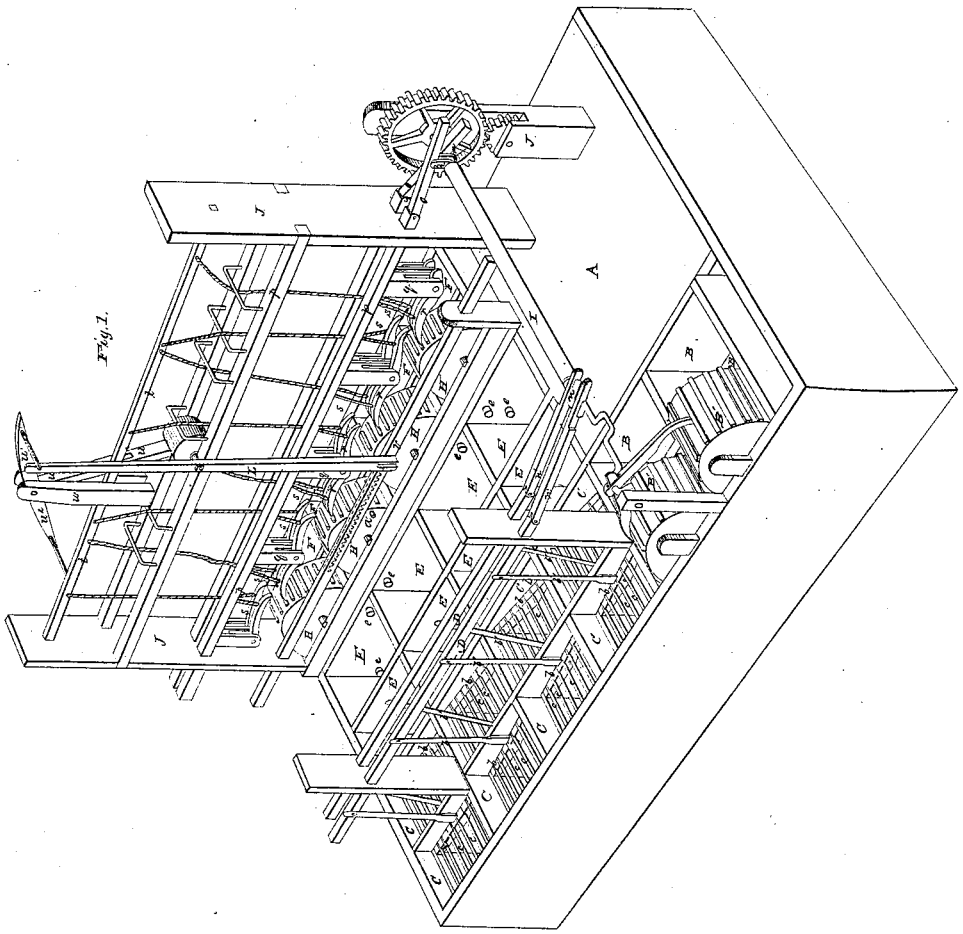


Fig. 2.

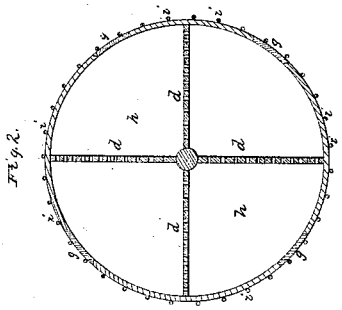
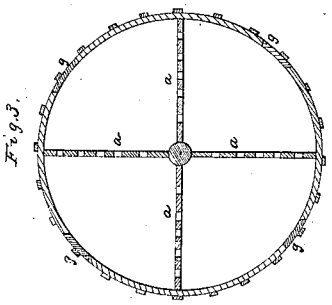


Fig. 3.



UNITED STATES PATENT OFFICE.

WM. H. ROSENSTEEL, OF NEW OXFORD, PENNSYLVANIA.

TANNING APPARATUS.

Specification of Letters Patent No. 7,089, dated February 12, 1850.

To all whom it may concern:

Be it known that I, WILLIAM H. ROSENSTEEL, of New Oxford, in the county of Adams and State of Pennsylvania, have invented certain new and useful Improvements in Tanneries, of which the following is a full, clear, and exact description, reference being made had to the annexed drawing of the same, making part of this specification, in which—

Figure 1 is a perspective view of a tannery complete with the exception of the building in which it is inclosed, Fig. 2 is a transverse section of a revolving tanning vat, and Fig. 3 is a similar section of the lining cylinder.

My invention and improvements relate to the general plan of the tannery—to the manner of constructing and operating the lining vats—the manner of constructing and operating the vats in which the skins are tanned—and the manner in which the hides are handled.

My general plan for the tannery is suitable for carrying on business upon any scale, large or small; and the only change requisite for adapting it to either the one or the other is to increase in the one case and diminish in the other, the size of the different parts.

Although I shall describe the manner of laying off and building a tannery upon my improved plan, yet, I wish it to be understood, that my improvements, in detail, can very readily be adapted to any tannery of the usual construction and arrangement of vats. I commence by erecting a building whose ground plan is of an oblong rectangular form. At one corner of the building I appropriate a space A for the propelling power, which in large establishments should be steam or other inanimate force; but for business on a small scale, animal power will answer very well. Upon this space I also locate the apparatus for breaking and grinding the bark, and likewise execute such of those operations which have to be done by hand as are usually performed near the vats. This space occupies one third of the length and two thirds of the width of the whole area of the tannery. The remaining third of the width and length of the tannery adjacent to the space A I occupy by four vats B which are each provided with revolving hollow cylinders B′ (but two of which are represented in place in the drawing) to contain the liquid and the hides, a section across one of these cylinders is seen in Fig. 3, it is divided into four sections by as many radial divisions *a* each perforated with numerous holes to form an intercommunication between the several compartments, through which the liquid circulates freely while the different lots of hides separated by the divisions are respectively confined to their appropriate compartments. One of these is used to soak the hides, one for bating, and two for liming. The remaining two thirds of the tannery is subdivided into twenty four vats; the eight marked C are appropriated to handling the hides at the commencement of the process, and are provided with suitable apparatus to effect that object mechanically, which consists of a frame *b* provided with numerous cross slats *c* to support the hides and mounted on a central axis which leaves it free to vibrate by the oscilation of the upright arm *b′* whose upper end is jointed to a rod D to which the arms of all the handling frames are in like manner jointed, and as this rod is constantly moved backward and forward by the machinery, it keeps all the handling frames constantly rocking in their respective vats. In the eight vats marked E the tanning of the hides that have been handled is completed. Of the remaining eight vats the four marked F are for the purpose of steeping bark to supply the tanning liquor; the remaining four vats are appropriated to the tanning of skins, each of these last four vats being furnished with a revolving cylinder H to contain the skins, which is immersed to half its depth in the vat. These vats are all made in the usual or in any convenient manner and are all connected by means of pipes passing through and between the partitions, which draw off the liquor and supply water in its stead. These connecting pipes have adjutages *e* into the several vats each adjutage being provided with a plug or cock, but as such a system of connecting vats by means of pipes is a common and well known device I do not deem it necessary to describe all its minutiæ particularly. The cylinders for tanning skins are hollow and each divided by longitudinal radial partitions *d* (as seen in the transverse section of one of them Fig. 2) into four sectors, the partitions being grated or perforated with numerous holes to allow the liquor to circulate freely through the whole. To each of the com-

partments of the cylinder access can be had for the purpose of either charging or uncharging it, through a sliding door (g) in the periphery. The shafts of the cylinders are provided with journals on each end, which turn in boxes on the sides of the vats. The periphery of each cylinder has a series of projecting ribs i upon it, parallel to the axis and at equal distances apart. These ribs where the cylinders are made of staves serve the double purpose of battening the joints, and forming teeth for the ratchets hereafter to be described to act against to turn the cylinders. Experience has demonstrated that if a quantity of hides or skins and bark be placed in a revolving hollow cylinder without partitions, that they will very soon be rolled into a tight knot or ball into the interior of which the tan can scarcely penetrate, while the outside from constant change of position and contact with the tan is rapidly converted into leather, and thus while one part of the hide is completely tanned the other part may be quite raw; this difficulty is partially remedied by giving to the cylinders a rotary motion alternately in opposite directions instead of rotating it continuously in the same direction, but the skins cannot be kept quite loose and open and equally exposed to the action of the tan without dividing the cylinder by partitions, this division together with the alternate turning of the cylinder in opposite directions, has been found fully to overcome all the before mentioned difficulties and perform the tanning with the utmost regularity and success.

I prefer to divide the cylinders into four compartments (they may however be divided into more or less than this number) and to fill two of the opposite compartments h with tan bark and place in the others as many skins as will lay therein loosely. Under this arrangement the liquor circulating in the cylinder will pass alternately through the bark and skins, thus constantly dissolving the tannin out of the former and transferring it to the latter.

Motion is communicated to the tanning cylinders H the vibrating handlers b and the cylinders B′ from the main driving shaft I which together with the rest of the machinery is supported by the frame work J. The shaft I is provided with two couples of opposite cranks m n. The cranks m are connected by the link rods o to the sliding bars p which they move backward and forward simultaneously in opposite directions. These bars p have arms q projecting downward, between whose forked ends double oscillating ratchets r are secured by joint pins. The opposite ends of each of these ratchets are connected by a cord s to the bar t which like the bars p p slides backward and forward in suitable guides. The bar t is moved alternately in opposite directions at intervals by a shifting weight w and when at the extreme of its motion one way will elevate one end of the ratchets by pulling up the cords s and causing their opposite depressed ends to catch between the ribs upon the cylinders and turn them in the direction in which they are pushed forward by the arms p, when these bars are at the opposite extreme of their motion the opposite ends of the ratchets will be depressed and act upon the cylinders to turn them in the opposite direction. If the arm u carrying the shifting weight be held in a vertical position the ratchets will be held by the cords in a horizontal position, neither end being in contact with the cylinders, and consequently not communicating to them any motion.

The manner in which the weight is shifted is as follows: a bar v slides lengthwise in the frame J to the under side of this bar a toothed rack (dotted in the drawing) is secured having a number of teeth corresponding to the number of turns it is required to give the cylinders at a time in either direction, a projecting pin on the end of one of the cylinders catches in this rack and moves it on one tooth at each revolution of the cylinder until moved the required distance to turn the lower arm of the lever L which is pivoted to it, far enough to throw over its upper arm against the pin u' and move it forward far enough to turn the arm u (to the cross head u^2 of which the pin u' is attached) far enough to bring the weight w to the same side of the axis of the arm u at which the upper arm of the lever L is for the time acting; when the prepondderance of the weight will immediately throw the arm u over to the extent of its arc of vibration carrying with it the bar t which is attached to it and drawing up one series of the cords s and elevating that end of the ratchets which before the weight was shifted, was depressed. The cylinders are always revolved in the direction in which the depressed end of the ratchets are pushed forward. In this manner the motion of the cylinders is changed at regular intervals, but as they are turned slowly the reversal of their motion produces no jar, or other inconvenience.

The bars D to which the arms b' of the handlers b are jointed are connected with the cranks n by the link bars n' through which they receive an alternating motion lengthwise; the bars D communicate to the arms of the handlers an oscillating motion; which is communicated to the frames, b and the hides hanging thereon.

The liming cylinders are worked in the same manner as the tanning cylinders, and their interior structure is the same, and made so for similar reasons.

The construction of the several parts hav-

ing been described I will now proceed to show the operation of the whole. The hides are first soaked in one of the revolving cylinders B′, they are then limed; the liming is effected in one eighth of the time which the operation usually occupies by placing as many hides or skins in the several compartments of the cylinders B′ as will lay loosely, and then filling them with lime water of a consistency somewhat thinner than cream, the vats being at the same time filled with lime water of the same consistency to prevent the water from leaking out of the cylinder by hydrostatic pressure; when the hides and skins have been subjected long enough to the action of the lime they are removed, and prepared in the usual manner for the subsequent operation of bating which is performed in the fourth revolving cylinder; when this operation is completed the skins are put in the revolving cylinders but not more at any one time than will lay loosely, and the hides are hung upon the slats *c* of the handlers *b* with the thickest part of the hide down in the bottom of the vat among the strongest liquor.

No tan bark is put in the handling vats but they are supplied with the spent liquor from the tan vats E, the vats F are now charged with bark and hides that have been handled the proper length of time are laid down alternately with layers of bark in the vats E. Water enters the vats F at but one point and has to traverse through every one of the vats, (except the lime and bating vats, beginning with the skin vats, before it is discharged, when water enters among the tan in the vat F^1, it is allowed to remain long enough to dissolve a large portion of the bark and then passes into the next vat, and so on until it arrives at the last of the vats whence it is discharged into the most advanced of the vats E in which the hides are packed; the bottom of the bark vats are grated and each communicates with its adjacent cylinder vat which is filled with liquor to the same level, so that the cylinder H being immersed to half the depth in the liquor the latter will circulate through them through interstices in the periphery and ends of the cylinders. The liquor when ready to be discharged from the last vat will be exhausted of a considerable portion of its strength by the skins in the cylinder H but will still hold in solution a large quantity of the tanning principle, sufficient to render it strong enough to treat hides with, and it is therefore passed into the strongest or most advanced hide vat and thence through the next weakest in succession until it arrives in the last whence it is transferred to the most advanced or strongest of the handling vats, thence to the next weakest in succession, until it arrives at the last, whence it is suffered to escape, being so entirely exhausted of the tanning principle as to be worthless. When the hides or skins of a vat are tanned the contents are taken out and replaced by a fresh lot and thus all the vats become in succession the most and the least advanced, and are consequently supplied alternately with the strongest and weakest liquor, the former being employed to finish and the latter to begin the process of tanning. The frequency with which the bark is required to be removed will depend upon the quantity of stock being operated on at the time.

Under this process it takes from eight days to four weeks to tan skins in the best manner, and about four months to tan hides, therefore one vat of skins and one of hides are finished every week, which are regularly replaced by a fresh lot. I prefer that the hides should remain in the handling vats two months, or half the period required to complete the process, and therefore there is one pack of hides transferred from the handlers each week and packed down into the vat whence the finished hides are removed.

In this manner all the parts of the tannery are so proportioned and arranged with each other as to work harmoniously; the bark is exhausted of its tan by submitting it successively to weaker liquors ending with pure water, and the tanning liquor is exhausted of its tanning principle by applying it successively to hides in a less advanced state, until it is finally applied to raw hides; while the hides being gradually advanced from the weakest to the strongest liquors are quickly tanned to their center without that contraction of the surface which results from the application of strong liquors in the commencement of the process. It will also be perceived that the only labor necessary in tanning the hides is to transfer them once from the handling to the finishing vats, thus saving the expense of the frequent hand handlings usually required.

What I claim as my invention and desire to secure by Letters Patent is—

1. Revolving the tanning cylinders alternately in opposite directions substantially as herein set forth.

2. Handling the hides in the spent liquor from the tan vats E substantially in the manner herein set forth.

3. Liming hides or skins in a close revolving cylinder substantially as herein set forth.

In testimony whereof I have hereunto subscribed my name.

W. H. ROSENSTEEL.

Witnesses:
P. H. WATSON,
L. L. SINOTT.