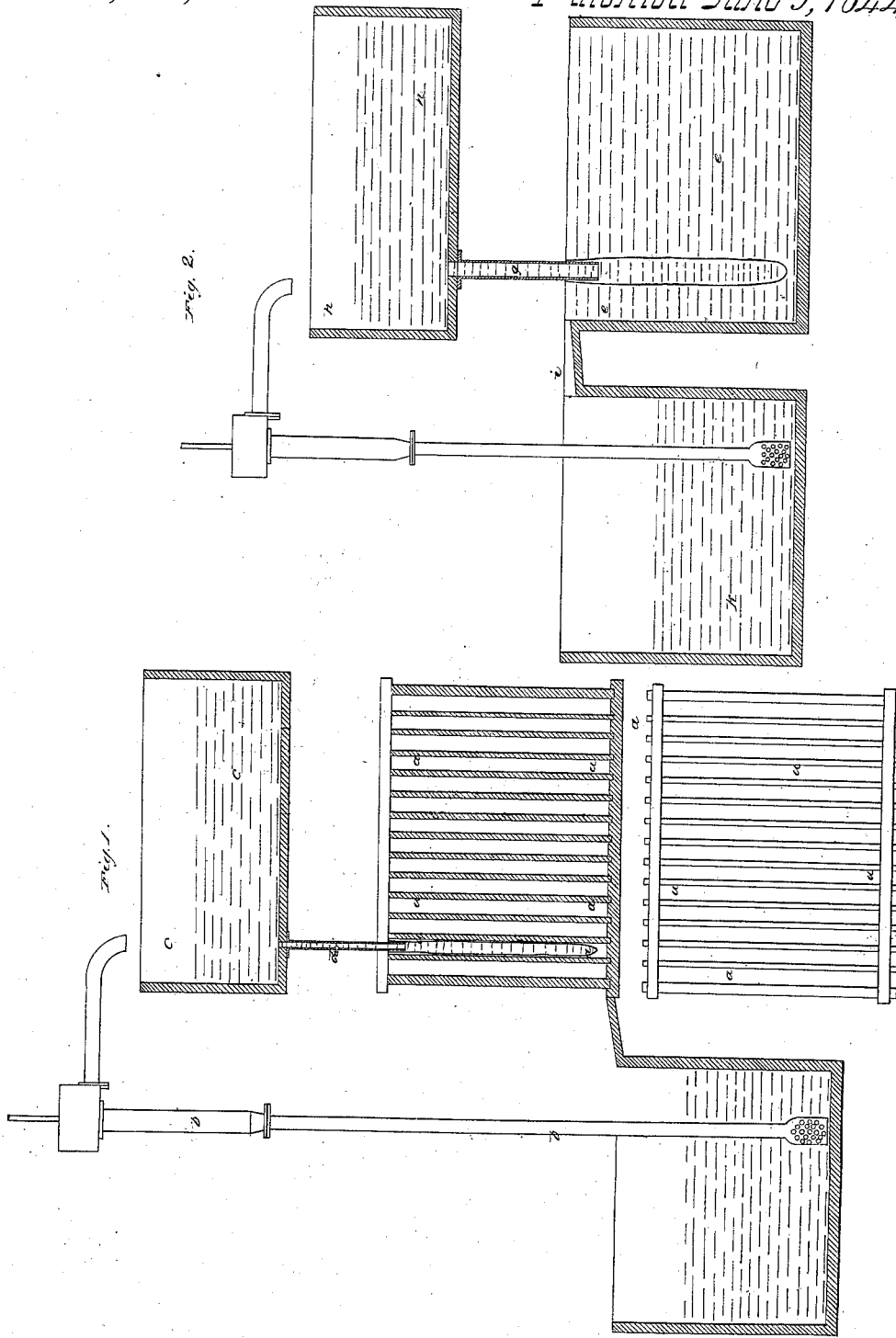


J. Cox,

Tanning Apparatus.

N^o 3,614,

Patented June 5, 1844.



UNITED STATES PATENT OFFICE.

JOHN COX, OF GORGIE MILLS, SCOTLAND.

TANNING.

Specification of Letters Patent No. 3,614, dated June 5, 1844.

To all whom it may concern:

Be it known that I, JOHN COX, a subject of the Queen of Great Britain, and now residing at Gorgie Mills, Edinburgh, within that part of Her said Majesty's United Kingdom of Great Britain and Ireland called Scotland, tanner and glue maker, have invented or discovered certain new and Improved Processes of Tanning Leather; and I, the said JOHN COX, do hereby declare the nature of my said invention and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof, that is to say—

The nature of my improved processes of tanning consists in superior methods to any yet practiced of the application of the principle of infiltration or percolation produced by hydrostatic pressure of tanning liquor through the fibers and pores of hides and skins when formed into a bag, thereby saving time, labor and capital and improving the quality of the leather. Various have been the methods hitherto attempted or proposed to facilitate the tanning of hides and skins by causing percolation of tanning liquor through their pores but these always have been attended with great inconvenience and expense in the working, or the leather produced has been unequally tanned and inferior in color and quality. The processes I am now about to describe remedy more or less all these disadvantages.

After the hides and skins have been prepared in the usual way (as is well understood) or by the assistance of my preparatory process (to be afterward described) for the tanning liquor each is to be made into a bag by carefully sewing the corresponding edges of the different parts together with good pack thread so as to cause as little waste as possible of any part of the said hides and skins or more hides and skins than one or only a part or parts thereof may be so formed into a bag but in all cases leaving an aperture at any convenient place by which the tanning liquor can be introduced therein and taking care to sew or close up any holes that may otherwise exist on the hides or skins that they may contain the liquor the more securely. In this state of bags they are in a condition to undergo or be submitted to any of my improved processes of tanning but previous to commencing it may be of some advantage for color to

handle them in liquor in the usual way for a day or two.

My first improved process of tanning is upon the principle of infiltration of liquor through the pores and fibers of hides and skins, but it is better calculated than other processes to save space and quantity of liquor requisite at a time and prevent any over distention of the fibers. The hide or skin being formed into a bag as before mentioned I confine or support it within a narrow compartment or stall *a* (see Figure 1 of the annexed drawing) say four inches (more or less) wide and sufficiently long and deep as fully to contain the said bag when free from folds or wrinkles. It is necessary that the partitions forming the sides of the compartment or stall *a* should be of an uniform continuous smooth surface or nearly so and not racked or rough (which has been found not to succeed) so that the hide or skin shall not be injured or marked or unequally tanned from unequal reaction or support to the hydrostatic pressure but that the reaction or support of the partitions shall be exactly equal to the hydrostatic pressure at any given part of the hide or skin in contact with them. I prefer that the partitions be made of wood as smooth as possible but which may be lined with cloth or other porous substance if wished which however is not necessary. The liquor is to be supplied to the hide or skin bag by being lifted up by a pump *b*, or otherwise to a cistern *c* placed above the level of the said partitions when by fixing a tube *d* into the aperture left in the hide, and which tube *d* shall also be connected with the said cistern *c* liquor will flow into the hide bag when liquor is contained in the said cistern. When the liquor is introduced into the bag which is placed into the compartment care must be taken to keep it free from wrinkles or folds by drawing it upward and lengthwise as it fills so that the surface of the hide or skin may be pressed uniformly and smoothly against the sides of the compartment. In tanning in a compartment I prefer that the belly of the hide or skin should be placed uppermost and that the partitions of the compartment be placed vertically and parallel to each other and of such strength that they will not yield or give way by the hydrostatic pressure they will have to support. When a series of compartments are to be used in a row the pressure from one

hide or bag will counterbalance that from the one next it and thus render it unnecessary to use any strong wood for the partitions. The partitions should rest upon a
 5 good floor to which they should be firmly fixed and their tops or upper edges should be bound together by bars of wood. More than one bag may be put into a compartment if care be taken to supply them nearly
 10 equally with liquor and to prevent them from being wrinkled as percolation goes on although one hide be in contact with or press against another.

My second improved process of tanning
 15 by infiltration is still more perfect than the one above described as it causes equal percolation or equal effective pressure through or upon every part of the hide or skin and admits of said pressure being regulated to
 20 the greatest nicety and exactness from less than an ounce to several pounds per square inch so as to produce the most proper and equal degree of tension of the fibers of the hide or skin. It is also the most convenient
 25 process—can be easily applied in existing tan yards and improves the color and quality of the leather and causes less loss of tanning principle by decomposition from exposure of hide and liquor to the air. This
 30 process then is to cause percolation or infiltration of tanning liquor through the fibers and pores of hides and skins when sewn into bags by means of hydrostatic pressure, when the hides or skins are at the same time immersed in liquor. The position in which I
 35 prefer to have the hide or skin (when formed into a bag) when tanning according to this process is perpendicular in the direction of its length but it also may be confined in a
 40 compartment as already described with the addition that the hide or skin be immersed or suspended in liquor. The pit or cistern *e* Fig. 2 into which the hide or skin is to be immersed should be sufficiently deep to admit
 45 of its being totally submerged in liquor without or merely touching the bottom.

The manner in which I prefer to tan according to this process is to sew up the hide or skin as before mentioned but leaving the
 50 aperture for the introduction of liquor at the head into which I introduce and fix a rigid tube *g* connected with a cistern *h* about two feet above the level of the pit. I do not however confine myself to any
 55 given height for the feeding cistern *h*, or liquor therein to be, which may be varied advantageously according to the strength of the hides or skins under process, the strength of the liquor or stage of tanning. The connecting tube *g*, through which the liquor is
 60 to be introduced into the bag should be some inches in diameter (four inches being suitable) so as to admit of a plunger or rod being introduced into it occasionally to stir
 65 up the bark or sediment that may lodge at

the bottom parts. The hide or skin bag being tied tightly at the neck end to the feeding tube *g*, which tube *g* should be long enough to dip a little down among the liquor in the pit *e* in which the bag is to be
 70 immersed, tanning liquor is to be supplied to the feeding cistern when the bag will swell until it can contain no more liquor when percolation will commence and be continued with a vigor proportionally to the height of
 75 the liquor in the feeding cistern *h* above the liquor in the pit of immersion. As the bag fills with liquor, the pit *e* (having been previously full) will overflow (unless the liquor is supplied from the pit of immersion
 80 *e*) and therefore a run way *i* must be made for the liquor to flow to a reservoir *k* from which it may be pumped or lifted again to the feeding cistern and as the percolation goes on the liquor will flow to the reservoir
 85 *k* again to be raised and circulated as before. The hides or skins tanned according to this process may also be confined in compartments or jammed against each other for the sake of saving room and the quantity
 90 of liquor necessary at a time as described as being practicable in the atmosphere, but I prefer that each bag should have ample room for swelling out as far as its dimensions will permit as the tanning goes on
 95 rather more rapidly and equally in all the parts while the tension generated by the hydrostatic pressure is more equal rendering the leather more equal in texture and quality. In this process of tanning there is
 100 a double hydrostatic pressure exerted, a greater which is exerted inside of the bag and a lesser which is exerted outside of the bag and it is the surplus pressure (which is equal at all parts of the bag) of the one
 105 above the other that causes the percolation of liquor from within outward. In the processes described I prefer that the grain side of the hide or skin be outward though I do not confine myself thereto and I also
 110 prefer that some bark or other solid tanning ingredient be introduced into the bags so as to help to keep up the strength of liquor and to stop up any holes or apertures that may be in the hide or skin.
 115

Although pits are not deep enough to admit of the total immersion of the hides or skins it is of no great consequence whether the necks be above the liquor and thereby have rather less hydraulic pressure
 120 upon them provided there be as much pressure as to cause them to tan nearly as quickly as the thickest part of the hide or skin. The gentle hydrostatic pressure exerted inside of the hide or skin bag when
 125 tanning according to this process improves the quality as it consolidates the texture of the leather and equalizes its rigidity and elasticity and thereby will save the currier and shoemaker considerable trouble in set- 130

ting it out or beating it out to its natural limits of extension. For belt hides for machinery the tension kept up during the tanning will be of great benefit as from every 5 part being brought to an equal degree of elasticity or rigidity unequal stretching, twisting or screwing will be prevented after the belts are cut from the hides. By increasing the hydrostatic pressure as the tanning progresses the hide or skin will stretch 10 more nearly to its ultimate limits of tension and being thoroughly tanned in that position its capability of future tension will be greatly decreased. When the tanning is 15 completed the sewing is to be opened or cut out to allow the liquor to escape or it may be run out by means of a siphon by gently elevating the hide or skin as the liquor is run off after which it may be laid away for 20 a short time in a pit in the ordinary way to improve color or dried and finished as usual, care being taken to free it of the pack thread that may be adhering and paring off unseemly parts.

25 Having thus stated the nature of my improved methods of tanning and the manner of carrying the same into effect I would have it understood that I do not claim the

principle of tanning hides or skins by causing percolation of liquor by hydrostatic 30 pressure through their pores and fibers nor the sewing of hides and skins into bags nor simply filling them with liquor when unconnected with a feeding cistern and without causing additional hydrostatic pressure; 35 but I do claim the methods of tanning by hydrostatic pressure as described—

I claim—

1. Tanning hides and skins by hydrostatic pressure when formed into bags when they 40 are confined or supported or suspended into continuous smooth sided narrow compartments or stalls as described.

2. I claim tanning by hydrostatic pressure when a hide or skin is formed into a 45 bag and immersed totally or partially into liquor and either confined in a continuous smooth sided compartment or allowed to expand or swell to its natural dimensions without confinement or jammed against other 50 hides and skins as described.

JOHN COX.

Witnesses:

SAM CASPMAEL,
W. H. RITCHIE.