E. IRVING.

TANNING BY ELECTRICITY.

No. 6,373. Patented Apr. 24, 1849.

Fig. 1.

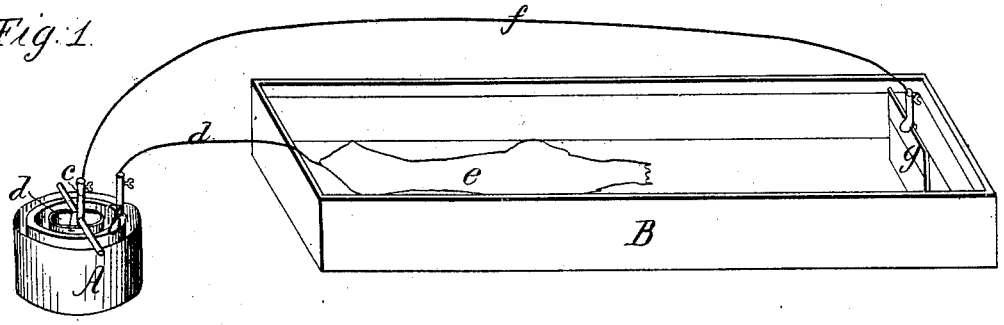


Fig. 2.

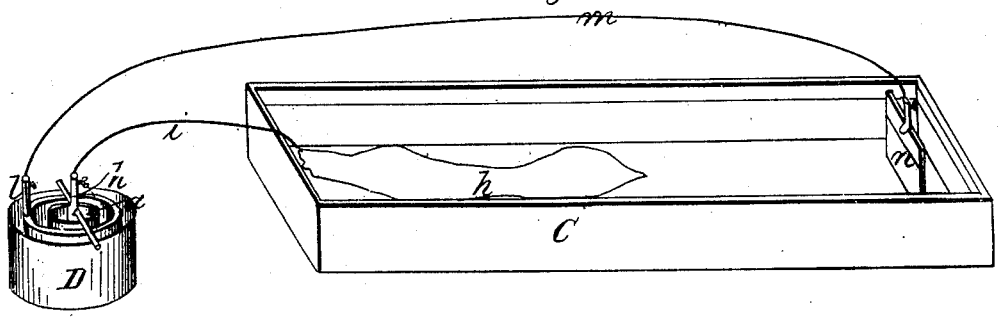
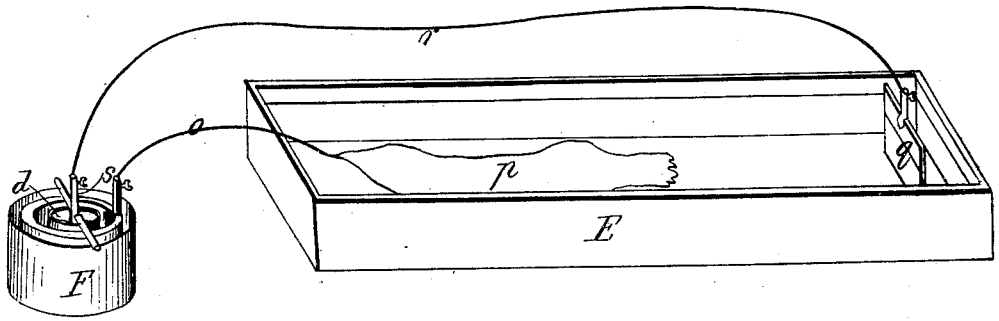


Fig. 3.



Witnesses;

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UNITED STATES PATENT OFFICE.

EPIDAURUS IRVING, OF NEW YORK, N. Y.

IMPROVEMENT IN TANNING BY ELECTRICITY.

Specification forming part of Letters Patent No. **6,373**, dated April 24, 1849.

To all whom it may concern:

Be it known that I, EPIDAURUS IRVING, of the city and county of New York, chemist, have, by experiment and research, discovered and ascertained the fact that the galvanic or any other electric fluids, however called into action, may be made active agents in fully, quickly, and cheaply effecting the tanning of all kinds of hides and skins into leather by so applying the action of the electric fluid that it shall excite chemical action during the primary processes and accelerate the chemical combination of whatever materials the tanning matter is composed, with the hide or skin, for which discovery, improvement, or invention I seek Letters Patent of the United States; and I do hereby declare that the mode of so applying the said discovery, invention, or improvements to use is fully described and shown in the following descriptive specification, and in the drawings annexed, containing three figures, each of which are hereinafter separately referred to.

The hides or skins are to be cleaned and prepared to receive the tanning material in any or all of the modes now in common use, which are all well known and need not be described; but during the process of liming the hides the effect of the lime in removing the hair may be increased by placing the hides or skins in contact with a wire from the zinc pole of a galvanic battery or other fit source of electricity in the manner shown in Figure 1. In this figure A is the usual glass cup, to contain a solution of oil of vitriol or sulphuric acid, and *a* is the porcelain cup with a solution of nitric acid. *b* is the zinc pole; *c*, the platina pole, all made as usual, and the battery is to be formed of any needful number of such cups, according to the extent of work in progress. The wire *d*, from the zinc or negative pole of the battery, is shown as connected to the tail end of a hide, *e*, in a lime-vat, B. The wire *f*, from the positive or platina pole *c*, is shown as connected to a zinc plate, *g*, immersed in a solution of lime in the liming-vat B. In these positions of the parts the electric current acts precisely on the same principle and in the same manner as when employed in the electrotype process—to deposit a solution of one metal on the surface of another metal—that is, the circulating current of electricity, in passing through the solution, acts to deposit the lime on the hide more quickly than in the ordinary process, and causes the hide to part with the hair, or the hair to separate from the hide, much sooner than usual. The conductor *g* in the lime-pit may be of any fit material that is found to answer best on practice. In this process great care will be needed not to use too much lime.

When it is desired to remove the lime from the hides this process is to be reversed and a sheet-iron plate substituted for the zinc plate *g*, Fig. 1, and the process is to be conducted as shown in Fig. 2. In this C represents either the dung-vat or a water-vat. D is the cup or battery, from the positive pole *h* of which the wire *i* is to be led into contact with the hide or hides *k*, and from the negative pole *l* the wire *m* is to be connected with the sheet-iron conductor-plate *n* lying in the dung or water in the vat C. In this process the electric current does not pass from the conductor *n* to the hide, but through and from the hide and through the dung or water to the conductor *n*, thence to the battery. The lime in all cases passes to the negative pole, so as to pass from the hide and aggregate round the metal conductor by an inversion of the previous process that deposited the lime on the hide, and this process clears the hide of the lime quicker than any usual known mode. In this process, if the dung-pit is not needed, the water-vat alone may be used. If the dung-pit is needed, the water-vat may be used afterward in the same manner to free the hides of any remnants of lime and dung.

When prepared and ready for tanning the hides or skins are to be placed in a vat, E, containing the tanning solution or solutions, as shown in Fig. 3 of the drawings. In this figure the wire *o*, from the zinc or negative pole of the battery F, is shown as connected at or near the tail end of each hide *p*. This connection may be made in any convenient manner to any part of the hide or skin, but my experience leads me to prefer making this connection to the tail end of each hide or skin, having seen cause to believe that the electric fluid circulates through the hide with more freedom to this end of the hide or skin than when this negative wire is connected to the head or opposite end of the hide or skin. Near the heads or opposite ends, or toward some other part of the hides or skins, a zinc conductor, *q*, is placed in the tanning-liquor, but is not brought into contact with the hides or skins *p*. By a wire,

r, this conductor *q* is placed in connection with the copper or platina pole *s* of the battery, which completes the electric circuit. The effects produced are that the circulation of the electric fluid through the liquor and through the gelatinous fibers of the hides or skins so highly excites the chemical affinity of the gelatine for the surrounding tanning matter that the absorption and chemical union proceeds with great rapidity, and the hide or skin is converted into leather in a time considerably less than is required in any other process known to me.

The platina or copper plate of the battery is usually known as the positive pole and the zinc pole as the negative pole, and these are herein named in the same sense, the positive pole conveying the electric fluid into the liquor and hides or skins and the negative pole receiving the fluid from the liquor through the hides into the battery. In the drawings one cup is shown, to represent a battery, but it will be understood that this does not limit the size or the number of cups in a battery, and one hide is shown in each vat, merely to avoid the complexity of crowding in more.

What I claim as new and of my own invention, discovery, or improvement, and desire to secure by Letters Patent, is—

The application of a circulation of the electric fluid supplied from any competent source of electricity to accelerate the process of liming and cleaning hides and skins, and also the application of a like circulation of the electric fluid to accelerate the process of tanning hides of any description with any proper tanning material or materials in solution, wholly irrespective of the description of hides or skins, and irrespective of the tanning substances employed, substantially as herein described and shown.

In witness whereof I have hereunto set my signature, in the city of New York, this 20th day of September, 1848.

EPIDAURUS IRVING.

Witnesses:

WM. SERRELL,

LEMUEL W. SERRELL.