(No Model.) 2 Sheets—Sheet 1.

D. M. EASTON.

METHOD OF TANNING.

No. 604,739. Patented May 31, 1898.

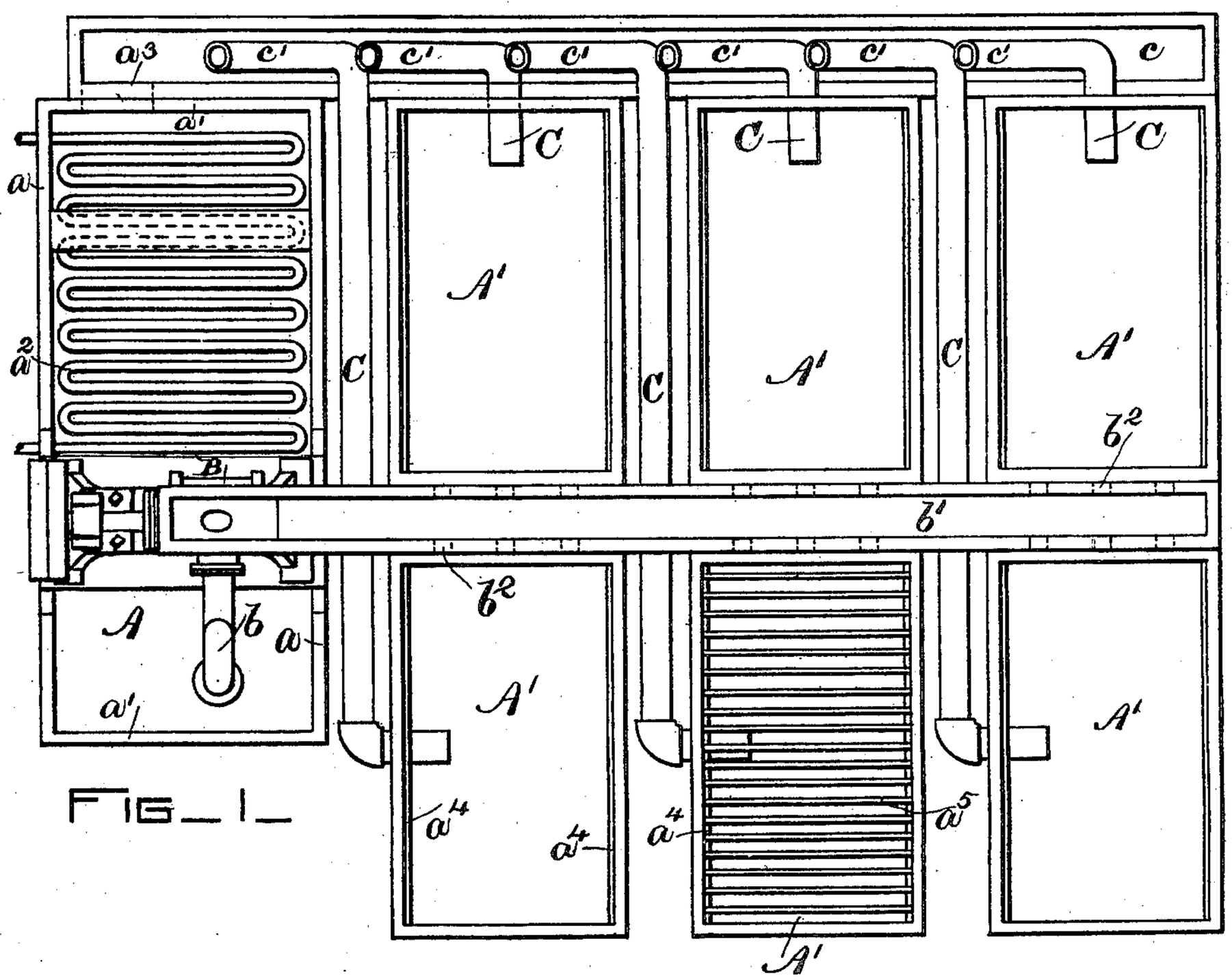


FIG. 1.

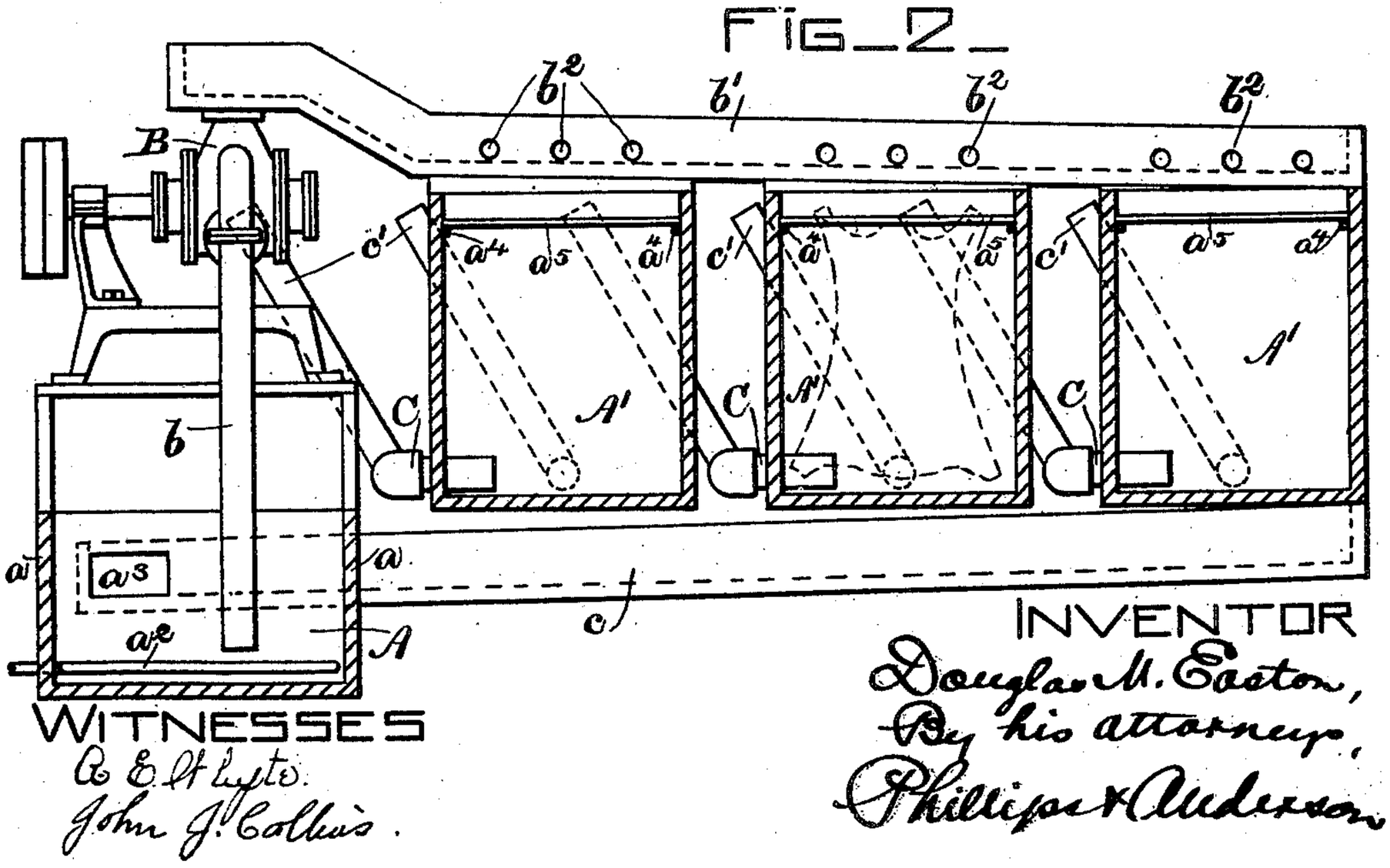


FIG. 2.

WITNESSES

R. F. Lyte.

John J. Collins.

INVENTOR

Douglas M. Easton,

By his attorneys,

Phillips & Anderson

(No Model.) 2 Sheets—Sheet 2.

D. M. EASTON.

METHOD OF TANNING.

No. 604,739. Patented May 31, 1898.

FIG. 3.

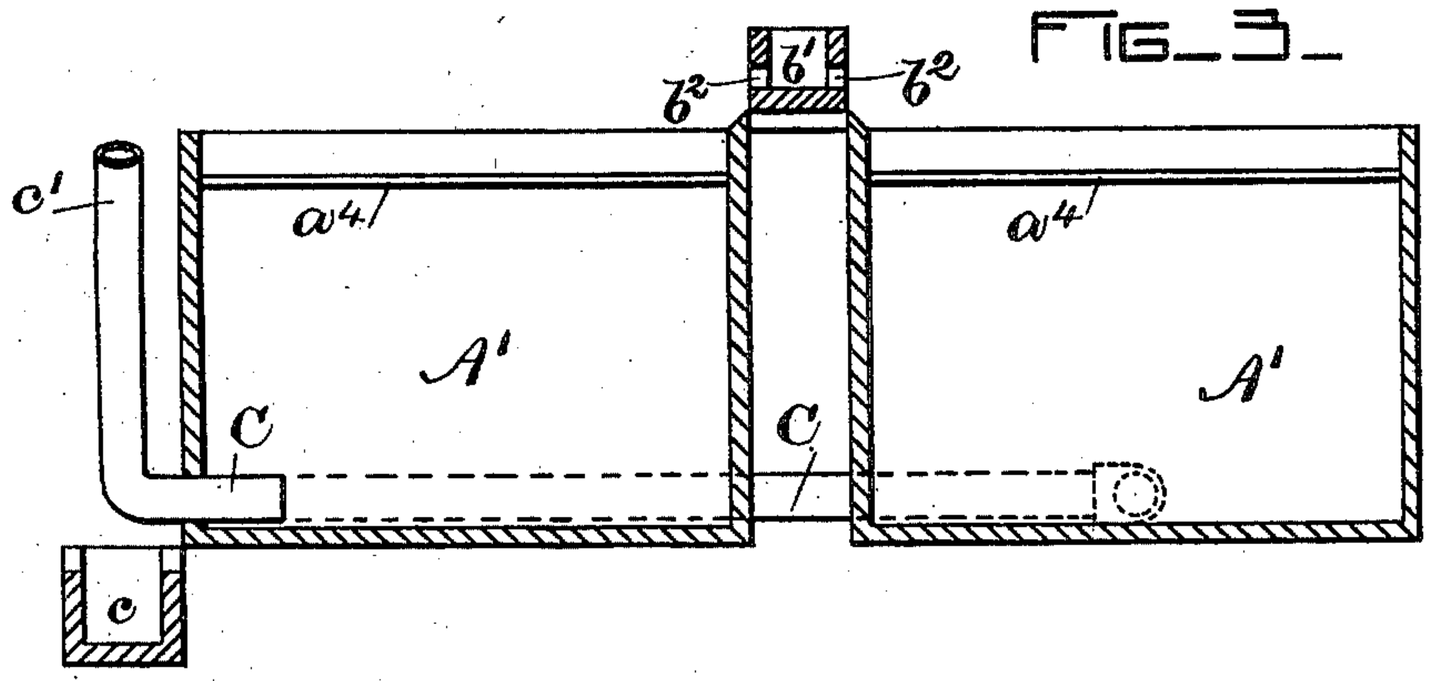


FIG. 4.

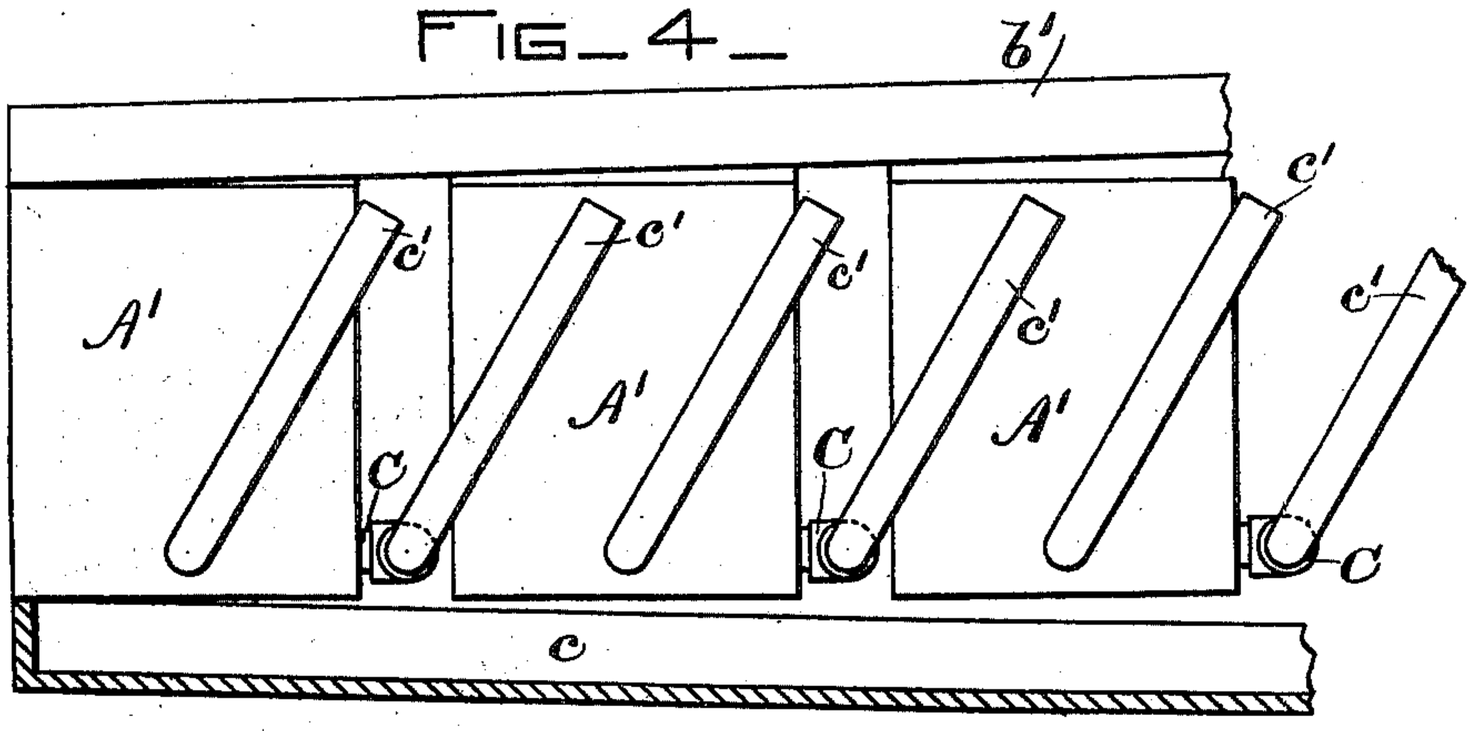
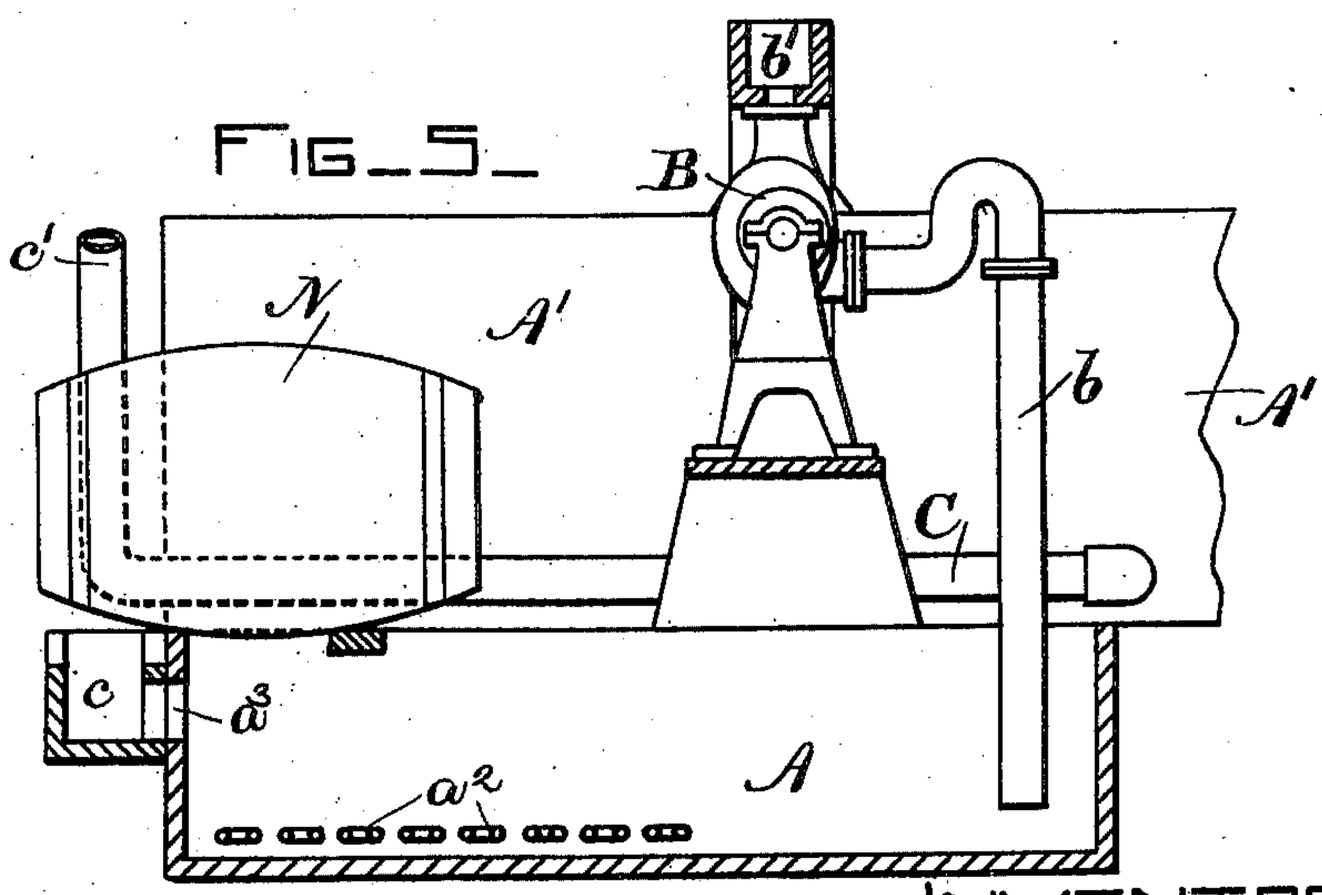


FIG. 5.



WITNESSES

A. E. Hyde.

John J. Collins

INVENTOR

Douglas M. Easton,

By his attorneys,

Phillips & Anderson.

UNITED STATES PATENT OFFICE.

DOUGLAS M. EASTON, OF WEYMOUTH, MASSACHUSETTS, ASSIGNOR TO MARSHALL C. DIZER, SILAS C. DIZER, AND WALTER M. DIZER, OF SAME PLACE.

METHOD OF TANNING.

SPECIFICATION forming part of Letters Patent No. 604,739, dated May 31, 1898.

Application filed November 30, 1897. Serial No. 660,191. (No specimens.)

To all whom it may concern:

Be it known that I, DOUGLAS M. EASTON, a citizen of the United States, residing at East Weymouth, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Methods of Tanning Hides; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to the manufacture of leather, and more particularly to an improved method of tanning hides.

In the art of tanning as heretofore practiced it has been customary to place the hides in a rotating or reciprocating vat and to impart to said vat a violent and rapid motion to cause the tanning liquor to be forced into the pores of the skin in order to expedite the tanning process; but such tumbling or shaking of the hides is very objectionable for the reason that the leather produced is apt to have a round hard grain, and, furthermore, the skins are often damaged by the rough usage to which they are subjected.

To overcome the objectionable features of the process above referred to, it has been proposed to suspend the hides in a stationary air and fluid tight vat and to force tanning liquors of different strength into said vat under hydrostatic pressure to act upon the hides therein, (see, for example, patent to Warrand, No. 517,083, dated March 27, 1894;) but the apparatus necessary to carry out such process is expensive and complicated, and by reason of the successive introduction into the vat of tanning liquors of different strength the results secured, unless the greatest care be used, are not uniform. It will be also noted that in processes similar to the Warrand process above referred to not only does the strength of the liquor vary as successive sets of tanks are brought into operation, but also while the same set of coöperating tanks upon the same level are being used the strength of the tanning liquor which is circulated through the vat is being constantly diminished as the hides being acted upon take up the tanning substances from said liquor. The hides are therefore at each step being treated by a tanning liquor constantly losing in strength, a feature which tends to retard the tanning operation and clearly distinguishes a process of this nature from the present process, as hereinafter described.

Another process which has been proposed in the prior art is to suspend the hides in a stationary vat which is filled with liquor from a leaching-vat, a junk-vat being provided to receive the liquor from the tanning-vats, which is afterward pumped back into the leaching-vats for the purpose of renewing its strength; but in such process the flow of liquor is not continuous and the liquor is not kept at a constant temperature or uniform strength, so that the best results are not secured.

The object of the present invention is to provide an improved process of tanning requiring no special skill or attention in its practice to secure uniform results and whereby the time required to complete the operation of tanning will be greatly reduced, and the tanned leather will be free from the round hard grain before referred to, tough and pliable, and heavier for a given weight of hide than that produced by processes heretofore proposed.

To the above end the present invention consists of the process which will be hereinafter set forth and claimed.

In the accompanying drawings is illustrated a preferred form of the improved apparatus for carrying out the present invention, in which—

Figure 1 shows a plan view thereof. Fig. 2 shows a longitudinal section through the well and one row of vats, as seen in Fig. 1, parts of the device being in elevation. Fig. 3 shows a transverse section through opposite vats. Fig. 4 is a detail view representing the arrangement of the vats and the means for regulating the height of the liquor therein. Fig. 5 is a transverse sectional view through the well, showing the arrangement of the steam-coils therein.

Similar letters of reference represent corresponding parts throughout the several views.

In the drawings, A represents the well in

which the tanning liquor is placed, and A′ represents a vat or a series of vats in which the hides are placed, said vats comprising any suitable number and being preferably of the shape and arrangement shown in the drawings.

In the present method the hides are held in the vats A′ free from motion, with the exception of such motion as may be imparted thereto by the flowing tanning liquor, and are subjected to a continuous flow of tanning liquor, which is maintained at an even temperature and at a constant specific gravity, whereby a very rapid and uniform action is secured on the hides without forming the round hard grain on the leather before referred to.

In the apparatus of the drawings the liquor containing the proper tanning ingredients for the particular hides being tanned is placed in the well A, in which it is heated. The heated liquor is conducted from said well to and through the vats A′ and from the vats back to the well A, the influent stream of liquor entering each vat being substantially equal to the effluent stream which is leaving the same, so that while being constantly changed the liquor in the several vats in which the hides are submerged stands at a constant level and has no movement except the circulation caused by the influent and effluent streams.

The well A is located at one end of the series of vats A′, and, as shown in Figs. 2 and 5, the bottom of the well A is somewhat lower than the bottom of the vats A′ in order that the liquor in the vats may flow by gravity back to the well after it has passed through the vats and acted upon the hides therein. The well A may be of any suitable construction, that shown in the drawings being a rectangular box having side walls a and end walls a'. In the well A, and preferably near the bottom thereof, is a steam-coil a^2, through which steam is constantly forced from any suitable source to heat the tanning liquor.

The tanning liquor is pumped up from the well A by means of a suitable pump B, which raises the liquor through a pipe b, extending into the well A, and discharges the liquor into a conduit or trough b', which is inclined from said pump toward the vats A′, as clearly shown, and from which it flows into the vats, said trough being closed at its end and having along its sides openings b^2, from which the liquor flows to the vats A′.

In the drawings are shown six vats arranged in parallel rows of three, and for convenience the trough b' is located between the rows and has openings b^2 through both of its walls; but it is to be clearly understood that the arrangement depicted in the drawings is merely illustrative of a preferred form of the apparatus and that the present invention is not limited to any particular arrangement or number of vats, it being simply necessary to so arrange the well and vats and the connecting conduit or trough that a constant circulation of the tanning liquor from the well to the vats and from the vats back to the well will be produced sufficiently rapid to prevent a too great cooling of the liquor in the vats.

From the side or end of each vat A′ leads a discharge-pipe C, which extends to and empties into a trough c, which is conveniently arranged along one side of the row of vats, as shown in Fig. 1, and which trough is inclined downwardly toward the well A and communicates with said well by an opening a^3 in one end thereof, as clearly shown in Fig. 2.

As shown in the drawings, the discharge-pipes C communicate with the respective vats A′ near the bottom, and their outer ends c' are arranged to project upwardly toward the top of the vats A′, and the open ends of said pipes are disposed directly over the trough c, so that the tanning liquor discharged therefrom will fall into said trough and be conveyed back to the well A.

In practice the ends c' of the discharge-pipes C are preferably so arranged that they may be inclined more or less, as desired, in order to control the height of tanning liquor contained in the vats. It is important to note in this connection that the heated liquor is discharged directly from the conduit or trough b' into each of the series of vats A and does not flow from vat to vat. This feature is of importance where my improved process is carried out by an apparatus comprising more than one vat, since if the liquor were discharged into one vat from the conduit or trough and allowed to flow into the succeeding vats the temperature of the liquor in the several vats would vary.

The vats A′ are provided with any suitable means to suspend the hides therein, in the apparatus of the drawings such means consisting of suitable projecting ribs a^4, which are secured along the interior surfaces of the side walls of the vat near the top, which ribs are arranged to support suitable bars a^5, to which the hides are secured in any suitable manner and from which they are suspended, as shown in dotted lines, Fig. 2.

To compensate for the loss of the strength of the tanning liquors caused by the absorption of the tanning substances from the liquor by the hides during the tanning operation, tanning liquor of the required strength is added to the liquor in the well A as required to keep the liquor in the vats at a uniform strength. While such liquor may be added by any suitable means without departing from the spirit of the present invention, I prefer that the same should be allowed to run into the tank A in a constant stream of sufficient volume. In practice I have found it desirable to use for tanning steer-hides liquor of a strength of from 9° to 10° Baumé and for calf-skins from 5° to 6° Baumé, and to supply the tanning substances as absorbed by the hides I allow a small stream to flow into the tank A from a barrel N or other suitable receptacle

containing the usual commercial extract, which will average about 25° Baumé. Where such extract is used, to secure a product of about fifty hides a day I find that about three barrels a day added extract gives the best results. For calf-skins requiring weaker liquor less extract is added. If the liquor becomes too strong, the extract may be reduced or water added to the liquor in the tank A.

It will be noted that the constant supplying of new liquors as required to keep the liquors in the vats at a constant strength will cause a continued increase in the total amount of liquors in the system and that some provision is necessary to prevent such accumulation of liquors or to properly dispose of the surplus. For the above reason I have found it preferable to provide open vats or vats so constructed that the liquors therein are exposed to the action of the atmosphere, by which arrangement I find in practice that the evaporation of the liquors will prevent the accumulation above referred to and maintain a practically constant quantity of liquor in the system. I may further say in this connection that to facilitate the evaporation of the liquors, as above described, I find it desirable in practice to keep the liquors in the vats at a temperature a little above that of the atmosphere. I may further say that the constant removal of old liquors by evaporation, as above described, and the constant supplying of new liquors to replace the same tends to keep the liquors sweet and pure and greatly facilitates the tanning operation.

While, as before stated, the evaporation of the liquor as above described is of considerable importance and materially contributes to the successful results secured by my improved process, I do not consider such feature as absolutely essential to the successful operation of my process, although it possesses marked advantages over any other means known to me for preventing the accumulation of liquors. I would also say that I do not desire to limit my present invention to the specific means employed to keep the liquors at a constant strength, it being only essential that the required quantity of liquor shall be preserved to flood the hides and that the tanning substances taken up from the liquor by the hides shall be restored to keep the liquor at a substantially uniform specific gravity or strength throughout the tanning process.

In carrying out my improved process by the apparatus of the drawings the well A is filled with tanning liquor of the required strength, which is brought to the proper heat (preferably from 75° to 80° Fahrenheit) by means of the steam-coil a^2. The liquor is then pumped out of the tank A into the conduit or trough b' and flows into the vats A', the liquor in the well A being replenished as required until all the vats are filled with heated liquor, and this operation is continued until the liquor in all the vats has reached the required temperature, (preferably 75° to 80° Fahrenheit,) which is substantially uniform throughout all the vats. The hides, which have been previously nailed or otherwise suitably secured to the bars a^5, are then immersed in the liquor, the bars a^5 resting upon the ribs a^4, so that the hides are suspended out of contact, but close together, for economy of space.

The length of time which the hides are allowed to remain in the vats depends upon the nature of the hide, an average steer-hide requiring about ten days, while a calf-skin may be tanned in twenty-four hours.

While the hides remain in the vats the pump is kept constantly in operation and the liquors are constantly changing, there being a constant inflow from the tank to the vats and an outflow from the vats to the tank. The tank A in my improved apparatus may be aptly termed a "rectifying-tank," for in the passage through the same from the vats the liquors are supplied with their lost heat and strength, so that the changing liquor in the vats is kept at a substantially uniform temperature and specific gravity.

While I have described my improved process and the preferred form of my apparatus whereby the same may be practiced, it is to be understood that the practice of my process is not dependent upon the particular apparatus described, but may be practiced by any desired apparatus. I do not claim the apparatus herein, but in a copending divisional application, Serial No. 677,584, filed April 14, 1898; but

What I do herein claim as novel, and desire to secure by Letters Patent of the United States, is—

1. An improved method of tanning consisting in flooding the hides in a stationary vat with a continuously-flowing tanning liquor kept at a substantially uniform temperature and strength, substantially as described.

2. An improved method of tanning consisting of flooding the hides in a stationary vat with a continuously-flowing tanning liquor exposed to the action of the atmosphere and kept at a substantially uniform temperature and strength.

In testimony whereof I affix my signature in presence of two witnesses.

DOUGLAS M. EASTON.

Witnesses:
CHARLES B. CUSHING,
WM. M. REAMY.