

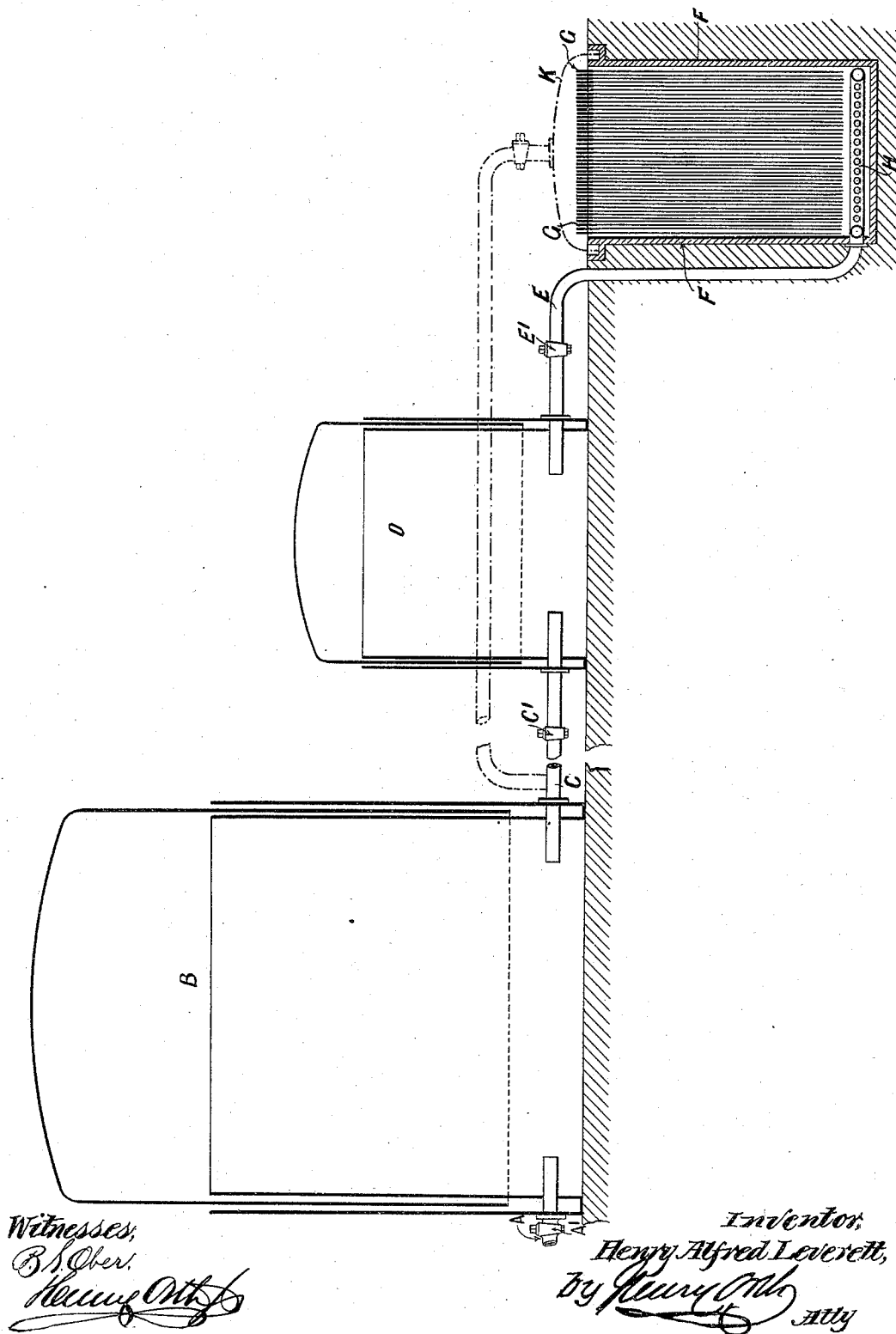
(No Model.)

H. A. LEVERETT.

PROCESS OF AND APPARATUS FOR TANNING.

No. 542,680.

Patented July 16, 1895.



# UNITED STATES PATENT OFFICE.

HENRY ALFRED LEVERETT, OF LONDON, ENGLAND, ASSIGNOR OF ONE-FOURTH TO THOMAS HENRY LEE BAKE, OF SAME PLACE.

## PROCESS OF AND APPARATUS FOR TANNING.

SPECIFICATION forming part of Letters Patent No. 542,680, dated July 16, 1895.

Application filed August 28, 1894. Serial No. 521,494. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY ALFRED LEVERETT, a subject of the Queen of Great Britain, residing at London, in the county of Middlesex, England, have invented certain new and useful Improvements in Tanning Skins and Hides; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the application of currents of hydrogen gas or any suitable gaseous compound of same in which arsenic is present, as hydrogen arsenide, which is caused at intervals to pass through the tanning liquor in the pit or vessel containing the hides or skins to be tanned. By this action the process of tanning is greatly expedited, and at the same time superior qualities of leather are produced at a cheap rate.

The invention is specially applicable to open tanning-pits; but the pits may, if desired, be provided with covers for temporary closing, if it is intended to save some of the hydrogen gas and lead it back to the gas-holder for further use, instead of letting it escape in the air from the open pit. The intermittent admissions of the gas may be advantageously effected by adjustable automatic appliances. The hydrogen gas may advantageously be produced by the aid of sulphuric acid of commerce acting on ordinary zinc or iron, or by passing steam through a retort containing pieces of iron or other suitable material.

When the hydrogen is produced by either of the two methods referred to, it will take up the arsenical impurities in the metals, which are generally present in sufficient quantity to insure a proper proportion of arsenic in the gas. The arsenic acts as an antiseptic and tends to prevent the decomposition of the tanning agent, which is of great importance. I have found that hydrogen is the only gas which does not detrimentally affect the tanning liquor, the tanning agent (tannic acid) being decomposed or converted into gallic acid by those gaseous bodies or compounds heretofore employed, as nitrogen, or compounds of nitrogen, as air, or carbonic-acid gas. Furthermore, the hydrogen acts as

a vehicle for the tannin and carries it over and through the hides and keeps the pores open, and serves also to agitate the liquor. The hydrogen may, of course, be produced by electrolysis; but this would be objectionable on the score of expense.

The proportion of arsenic in the hydrogen arsenide will, of course, vary according to the nature of the hides to be tanned, a mean proportion being about two milligrams of arsenic to ten liters of hydrogen.

The accompanying drawing illustrates one suitable mode, out of many, for carrying the invention into effect, being a vertical section through a pit and appurtenances thereto.

The pipe A from the hydrogen-generator conveys the gas to the store or gas-holder B, and the gas is, by a pipe C, led to a smaller gas-holder D, and thence by a pipe E to the lower part of tanning-pits F, containing the hides or skins, which may suitably be suspended from rods or cross-bars G. Taps or valves A', C', and E' are provided to regulate the admission of the gas.

The gas from the generator is admitted to the gas-holder B, the bell of which is suitably weighted or loaded to the required pressure. Gas is admitted from it to the smaller gas-holder D, which may be adapted in size for a number of tan-pits, and has its bell suitably weighted for the pressure required to drive the gas through the liquor in the pit or pits without causing the liquor to flow over or splash over. By the use of the smaller gas-holder D an even and adjustable pressure of the gas admitted to the tan-pits is insured. In this invention it is considered advantageous to use one large or a few large tan-pits rather than a number of small pits, as now usual, and indeed necessary, because of the periodical "handling" of the skins. This handling is in this invention dispensed with. The tap E' (or taps, if a number of pits are used) having been opened, the gas flows into the lower part of the pit F, distributing itself into a nest of pipes H in the lower part of the pit and, issuing from fine holes in the said pipes, passes up through the spaces between the skins, thereby agitating the liquor and passing off into the air at the open pit (or, if desired, when the cover K is put on and the

weight of the bell of the gas-holder B has been suitably relieved the gas is made to return to the gas-holder B) through a suitable valved pipe (shown in dotted lines in the drawing) and connecting the gas-holder or cover K with the pipe C on the inlet side of valve C'. The hydrogen is admitted for the space of a minute or a few minutes only at a time—that is to say, at intervals of say one to four hours, all according to the nature of the hides and the class of leather to be produced. An unduly lengthened or continuous action of the gas is detrimental and produces harsh or hard leather.

In some cases it is advisable to suspend for a day or more the periodical admission of the gas, in order to prevent the grain of the hides from being unduly hardened.

The length of time of admission is or may be effected by the apparatus itself, if the cubic contents of the gas-holders and the tan-pits are properly proportioned. When the valve or tap C' between the two gas-holders is closed, and the tap or taps E' to the tan pit or pits are opened, the gas in the gas-holder D will flow into the pit or pits until its power to pass up through the liquor is equaled by the resistance of the liquor, and will thus cease of its own accord. The action will not commence again until the gas-holder D is recharged with sufficient gas-pressure from the gas-holder B. The periodical opening and closing of the tap C' between the two gas-holders B and D may be effected either by hand or automatically by means of suitable machinery. This machinery may be clock-work or any other motor driving a shaft, so as to make it rotate very slowly to open and shut by suitable tappets or other devices the said valve C' at the required intervals and for the space of time required, or the valve C' may be made to control so small an opening that it takes from, say, one to four hours to recharge the gas-holder D, the time being determined by giving one or more turns to the valve-spindle, which is formed with a very fine screw-thread accordingly—say, for instance, one turn in opening the valve representing four hours to recharge; two turns, three hours, and so on.

Any other suitable self-acting means may be applied for carrying out the purpose in view. Instead of the valve C', or in addition thereto, a self-acting automatic pressure-reducing valve may be provided between the two gas-holders, so as to prevent the pressure in the gas-holder D from rising above a fixed maximum. The admission from the gas-holder D to the tan-pits may then be effected by means of taps or valves actuated by automatic machinery, as above described, and either to open and close simultaneously for all the pits, or for one after the other.

The action of the hydrogen has the effect of shortening the period of tanning skins and hides to such an extent that even those of thick substance may be tanned in a compara-

tively short time, while (and this is a very important feature or result of this invention) the fiber strength, the quality, the color, and the appearance of the leather are equal to those of the leather produced by the ordinary tanning process of many months' duration; also by this process is avoided the so-called "handling" of the skins, which involves much time and labor, and a great saving in tanning material is effected.

Having fully described my invention, what I desire to claim and secure by Letters Patent is—

1. The improvement in the process of tanning hides and skins, consisting in passing a gaseous compound consisting in part of hydrogen arsenide at intervals through the tanning liquor in the pit or vessel containing the hides and skins to be tanned, substantially as set forth.

2. The improvement in the process of tanning hides and skins, consisting in passing hydrogen containing hydrogen arsenide at automatically regulated intervals through the tanning liquor in the pit or vessel containing the hides and skins to be tanned, substantially as set forth.

3. In a tanning apparatus, the combination with a pit provided with a suitable cover, a support from which the hides or skins may be suspended and a perforated pipe at the bottom of said pit, of a main gas holder, an auxiliary gas holder of predetermined capacity, a pipe connecting the main and auxiliary gas holders, a pipe connecting the last named holder with the aforesaid perforated pipe, and means for controlling the flow of gas through said pipes, for the purpose set forth.

4. In a tanning apparatus, the combination with a pit, a support from which the hides or skins may be suspended, a perforated pipe at the bottom of the pit, a gas collector covering the mouth of said pit, and a main gas holder and a pipe connection between the same and the aforesaid gas collector, of an auxiliary gas holder of predetermined capacity, pipe connections between the main and auxiliary gas holders and between the latter and the aforesaid perforated pipe, and means for controlling the flow of gas through the pipe connections, for the purpose set forth.

5. In combination with a pit adapted to contain tanning liquor, of a device for distributing gas through the liquor in said pit, a gas holder, and suitable connections therewith, an intermediate pressure chamber between said gas holder and distributing device, and a gas collector over said pit with pipe connections to the gas holder, substantially as described.

6. In combination with a tanning pit adapted to contain tanning liquor, of a device for distributing gas through the liquor in said pit, together with a gas holder, suitable connections between the device and holder, an intermediate pressure chamber, and means for regulating the flow of gas from the gas

holder to the pressure chamber and from the pressure chamber to the distributing device, substantially as described.

5 7. In combination with a pit adapted to contain tanning liquor, of perforated pipe at the bottom of the pit, and a removable gas collector adapted to close the mouth of said pit, a source of gas supply, pipe connections between the latter and the system of perfo-

rated pipe and said gas collector, and means 10 for controlling the flow of gas to and from said source of supply, substantially as described.

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Witnesses:

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