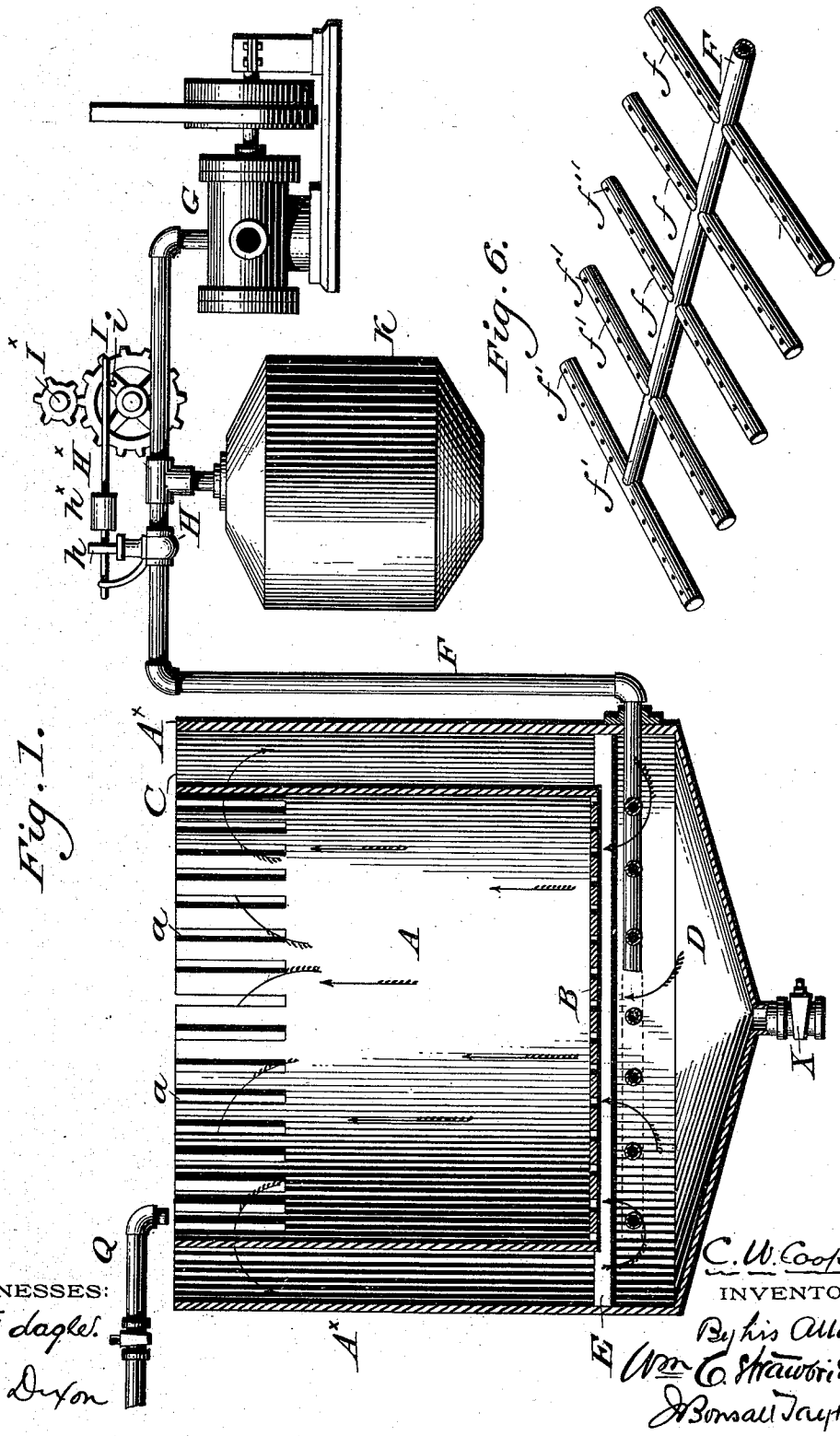
(No Model.) 2 Sheets—Sheet 1.

C. W. COOPER.

APPARATUS FOR TREATING HIDES OR SKINS.

No. 400,443. Patented Apr. 2, 1889.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

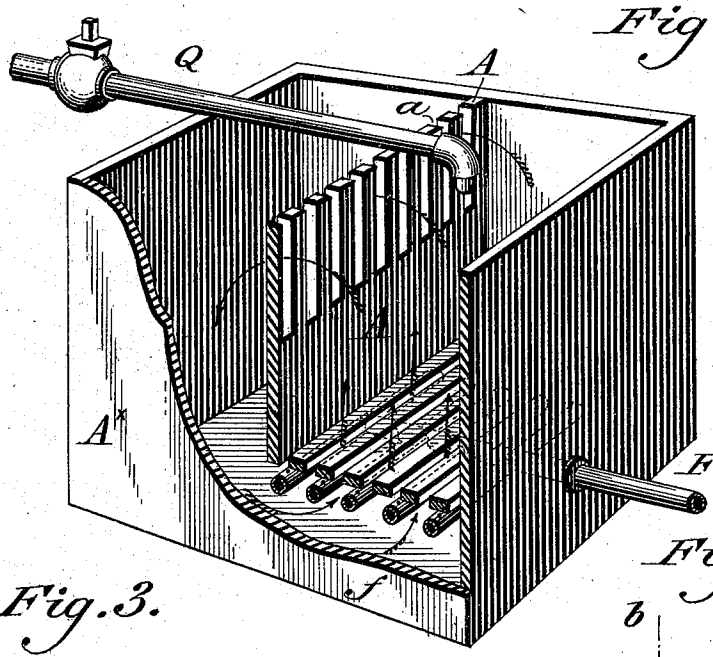


Fig. 3.

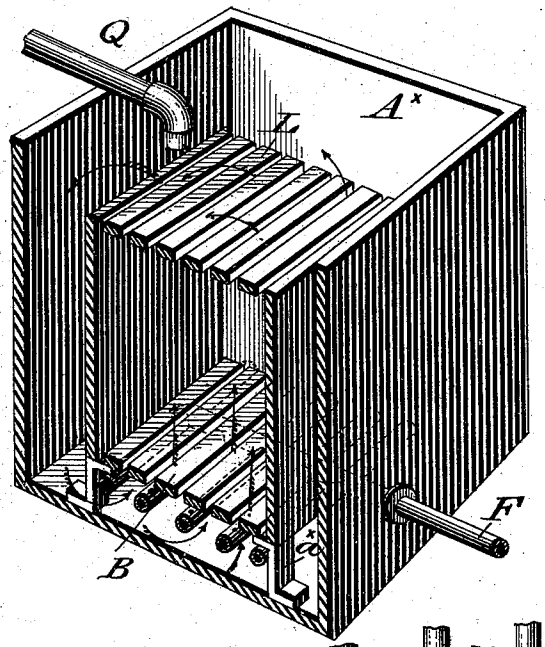


Fig. 4.

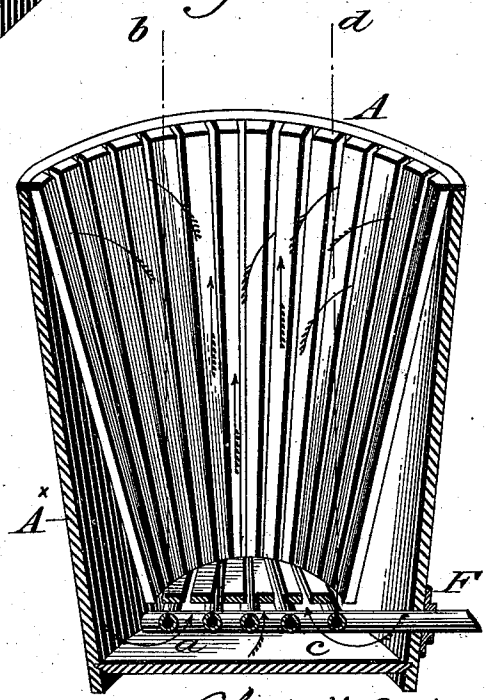
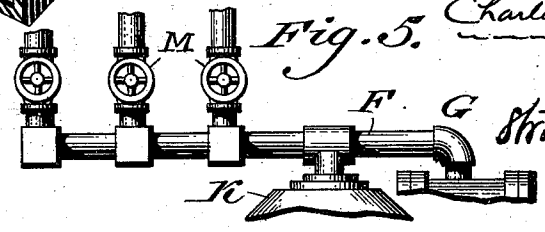


Fig. 5.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR TREATING HIDES OR SKINS.

SPECIFICATION forming part of Letters Patent No. 400,443, dated April 2, 1889.

Application filed July 6, 1888. Serial No. 279,199. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. COOPER, a citizen of the United States, residing at Brooklyn, in the county of Kings, and State of New York, have invented an Improved Apparatus for Treating Hides, Skins or Scraps, in Liquids, of which the following is a specification.

In the manufacture of leather from hides, or of glue from skins or scraps, it is frequently necessary to treat said hides, skins or scraps in a bath of water, or other liquid, either for the purpose of removing dirt and impurities therefrom, or for the purpose of chemically treating the said articles. In the washing operations referred to, or in the chemical treatment of the said hides, skins, or scraps, it is generally desirable to constantly or occasionally agitate the water, or other liquid, in which they are contained, and stir the mass, so as to occasion the presentation of every part of the hide, and of every piece of the skins or scraps treated, to the action of the bath or to the chemicals therein contained or to the action of a gas forced into the said bath, and it is also desirable, in processes for the washing of, or the removal of impurities from, hides, skins, or scraps, to cause every part of the surface of each of said articles to come into contact with other pieces of the mass in order that the impurities on their surfaces may be mechanically removed thereby. Heretofore in the washing and chemical operations incident to the treatment of hides, skins or scraps, various mechanical devices have been employed to agitate the mass, but most of these devices have been open to the objection that they have involved the use of complicated, heavy and expensive apparatus, and the use of costly machinery for the transmission of the necessary power.

The object of my invention is to provide apparatus by which hides, skins or scraps, in a bath of water or other liquid, may, for the purposes above described, be thoroughly, conveniently and cheaply treated, and, generally stated, it consists in the apparatus hereinafter described and claimed.

An apparatus conveniently embodying my invention is shown in the accompanying drawings, in which:—

Figure 1 is an elevation partly in section of my apparatus. Fig. 2 is a fragmentary perspective view of a modified form of apparatus. Fig. 3 is a fragmentary perspective view of a modified form of apparatus. Fig. 4 is a central sectional elevation of still another modified form of apparatus. Fig. 5 is a detailed elevation of devices adapted to feed air or gas to a number of containing tanks or vessels. Fig. 6 is a detailed view of a system of air or gas pipes suitable for employment in connection with the apparatus shown in the drawings.

Similar letters of reference indicate corresponding parts.

In the apparatus shown in Fig. 1, A is a containing vessel or the inner vessel of the apparatus, shown as a cylindrical tank, provided with a slatted or perforated bottom B, and with liquid escape openings *a* at or near its top. The liquid escape openings, as well as the openings in the slatted bottom, are of such size as to prevent the escape of the hides, skins or scraps treated and to only permit of the escape of the liquid in which they are contained. $A^{\times}$ is a second tank, termed herein the inclosing tank, which as to its sides and bottom surrounds and incloses the inner tank. The relative size of each of the tanks is such that an annular space C of a given area is formed between the walls, and a space D between the bottoms of the tanks. The tank A is supported within the tank $A^{\times}$ in any preferred manner, conveniently by being superimposed upon trusses or supporting bars E extending across the interior of the tank $A^{\times}$ near the bottom thereof. Q is a pipe leading from any desired source of liquid supply and discharging into the tank A. X is a cock by which the liquid contents of the tanks may be drawn off. F is an air or gas pipe entering the tank $A^{\times}$ at or near the bottom thereof, extending nearly across the same, and provided with a system of transverse or other branch pipes *f* which lie beneath and within a space coextensive and coincident with the perforated bottom of the tank A, and are provided with a number of escape orifices *f'*. G is an air or gas force pump from which the pipe F leads. H is a valve, with the stem *h* of which is engaged a lever arm $H^{\times}$ provided

with a counter weight $h^{\times}$. I is a driven toothed wheel and $I^{\times}$ is a driving toothed wheel, both supported in any suitable manner and in engagement with each other. *i* is a pin or stud projecting from the side of the wheel I and of sufficient length to in the rotation of said wheel encounter the valve lever $H^{\times}$ and by elevating the same open the valve H. When the pin *i* travels away from the lever $H^{\times}$ the weight $h^{\times}$ causes it to descend and close the valve H. Many other devices for automatically opening and closing the valve at stated intervals might be resorted to without departing from my invention. K is a reservoir suitably supported in any convenient manner, and in communication with the pipe F at a point between the pump G and the valve H.

The operation of the apparatus will be readily understood.

The tank A is about half filled with the hides, skins or scraps to be treated and the tank $A^{\times}$ is filled to the proper level with water or other selected liquid. The valve H being open and the pump G being put into operation, air or gas as the case may be is forced through the pipe F and its branches *f*, and escapes at the outlets or orifices *f'* rises through the slatted bottom of the tank A, mingles with the liquid and articles undergoing treatment, and lessens the specific gravity of the whole, with the result that the contents of the tank rise and as one part after another of the mass reaches the surface the air or gas is freed therefrom, and the liquid, which thereupon resumes its normal specific gravity escapes through the outlets *a* into the space C, gravitates to the bottom of the tank, rises through the slatted bottom B and again enters the tank A. The valve operating wheel I is so timed as to after such a time has elapsed as is necessary to allow of all of the material undergoing treatment to rise toward the upper part of the tank A, allow said valve to close. The air or gas from the pump will thereupon be forced into and accumulate in the reservoir K. The cessation of the supply of air or gas to the tank permits the hides or scraps to sink through the liquid contained therein, and, after the lapse of a period of time necessary for such operation, the wheel I again opens the valve H, and air or gas from the pump G and also from the reservoir K, will be again forced into the tank A, under the mass, the operation described will be repeated as often as the nature of the material operated upon may require.

It is obvious that many constructions of apparatus, characterized by diversity of form but by unity of principle, might be devised to carry on the operation of which the specific apparatus described is capable. Thus, for instance, in Fig. 2 I have shown the inner tank A as rectangular and so constructed within the tank $A^{\times}$ that the side and end of the latter serve as the side and end of the former, the liquid escape outlets *a* being therefore formed in but one side of the vessel A, they may however if desired be formed in the end of said vessel.

Fig. 3 of the drawings illustrates a square exterior tank $A^{\times}$ within which the interior tank A is shown as mounted upon pedestals $a^{\times}$, and as provided with the usual slatted bottom B, and also with a slatted roof or lid L in lieu of the escape outlets *a* of Fig. 1.

In Fig. 4 of the drawings is shown a form of apparatus embodying a conical exterior tank and a conical interior tank, the upper end of which fits within and is secured to the upper end of the outer tank. The bottom and sides of the inner tank are slatted, so that the liquid escape outlets extend from its top to its bottom. In the apparatus shown in Fig. 4, the hides or skins to be treated, and liquid having been placed therein, and gas or air being forced into the bottom of the tank through the perforated pipes, which, it is to be borne in mind cover only an area coextensive and coincident with the slatted bottom of said tank, rises vertically within that portion of the tank included between the dotted lines *a b* and *c d* shown in said figure, and causes the ascent of the mass undergoing treatment, the air or gas is freed on reaching the surface of the tank, whereupon the liquid resumes its normal gravity and flows to that part of the tank exterior to the part contained between said dotted lines, passes through the slatted side of the tank by gravity and re-enters the tank at a point below the material undergoing treatment.

In Fig. 5 is shown a series of pipes and valves, three in number, intended to direct air or gas from the pump successively to three independent tanks, so that after the mass in one tank has been elevated by the entrance of air or gas from the engine and while it is subsiding, the air or gas can in the interim be forced into another tank or vessel. The valves are operated by the hand-wheels M.

It is to be understood that while in the claims I refer to the introduction of air to the mass contained in a tank and of air pipes through which the same is conducted,—the word is not to be understood in a literal sense but is to be taken as signifying not only air but gases of any character.

Having thus described my invention, I claim:—

1. In an apparatus for treating hides in water or other liquid, in combination, a tank adapted to contain the hides, having liquid outlet orifices formed therein at or near the top thereof, and provided with a slatted bottom, an exterior tank inclosing said hide containing tank, means for supporting said inner tank within said inclosing tank and clear of the walls thereof, and air pipes discharging into said hide containing tank at or near the base thereof, substantially as set forth.

2. In an apparatus for treating hides in water or other liquid, a tank adapted to contain the hides, liquid inlet and outlet orifices formed

therein, at or near the bottom and top thereof respectively an exterior tank inclosing said hide containing tank, and an air pipe furnished with outlet provided branches, situated at the base of the hide containing tank, all said outlets discharging within a space coextensive and coincident with the slatted or perforated bottom of said hide containing tank, substantially as set forth.

3. In an apparatus for treating hides in water or other liquid, a tank adapted to contain the hides, liquid inlet and outlet orifices formed therein, at or near the bottom and top thereof respectively an exterior containing tank, between the walls of which and the perforated walls of the inner tank are liquid spaces, an air pipe discharging into the base of said hide containing tank, a liquid supply pipe, and a drawing off cock, as specified.

4. In an apparatus for treating hides in water or other liquid, a tank adapted to contain the hides, liquid inlet and outlet orifices therein at or near the bottom and top thereof respectively and which open exteriorly into a common reservoir, an air engine, an air pipe leading from said air engine to and discharging into the base of the hide containing tank, a valve applied to the air pipe, and a reservoir in communication with the air pipe at a point between the engine and the air pipe valve, as specified.

5. In an apparatus for treating hides in water or other liquid, a tank adapted to contain the hides, liquid inlet and outlet orifices formed therein at or near the bottom and top thereof respectively and which open exteriorly into a common reservoir, an air engine, an air pipe leading from said air engine to and discharging into the base of the hide containing tank, a valve applied to said air pipe, a lever arm attached to said valve by the raising and lowering of which the valve is operated, a wheel having a pin projecting from its face adapted in the rotation of the wheel to operate said lever, and means for rotating said wheel, as specified.

6. In an apparatus for treating hides in liquor, in combination, a tank adapted to contain the hides, having liquid outlet orifices formed therein at or near the top thereof, and provided with a slatted bottom, an exterior tank inclosing said hide containing tank, means for inclosing said inner tank within said inclosing tank so as to leave spaces between the opposing walls thereof, an air pipe discharging into said hide containing tank at or near the base thereof, a valve adapted to open and close said pipe, means for automatically operating said valve, an air pump, and a reservoir in communication with said air pump, as specified.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 30th day of June, A. D. 1888.

CHAS. W. COOPER.

In presence of—
W. H. WOODHULL,
AUGUST HEINE.