

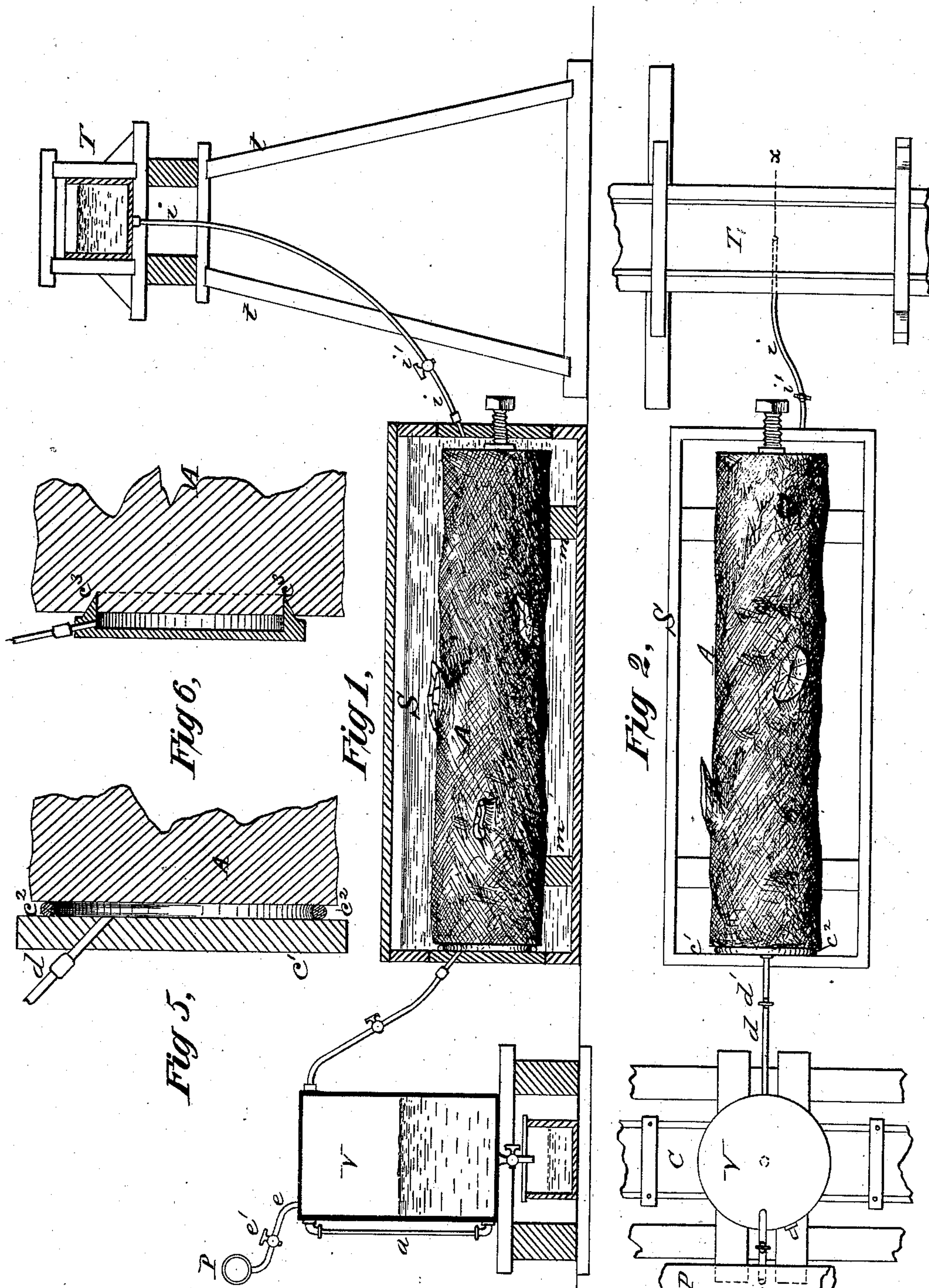
(Model.)

3 Sheets--Sheet 1.

H. FLAD.
Process for Preserving Timber.

No. 231,784.

Patented Aug. 31, 1880.



Attest
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Inventor
Henry Flad
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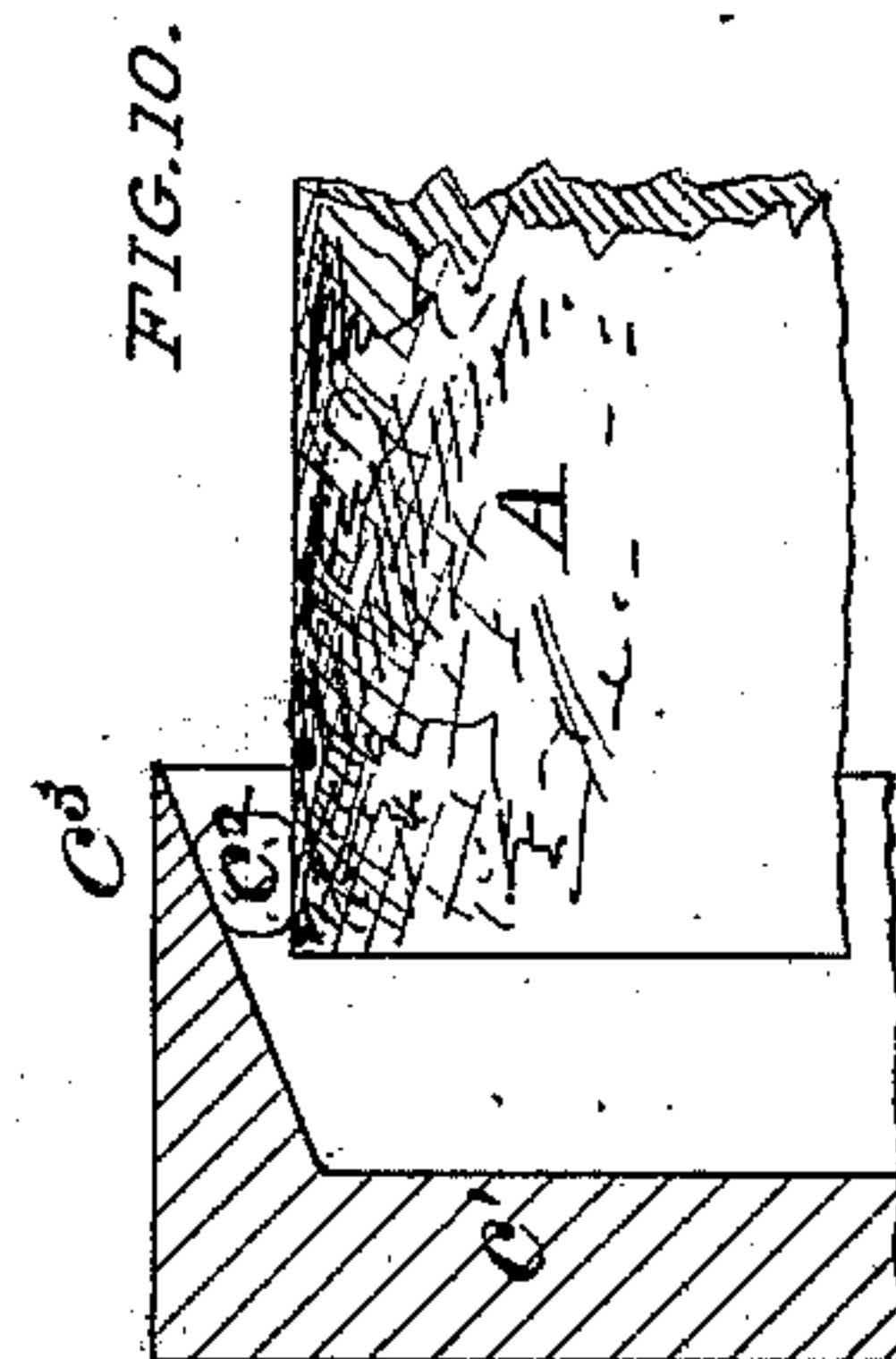
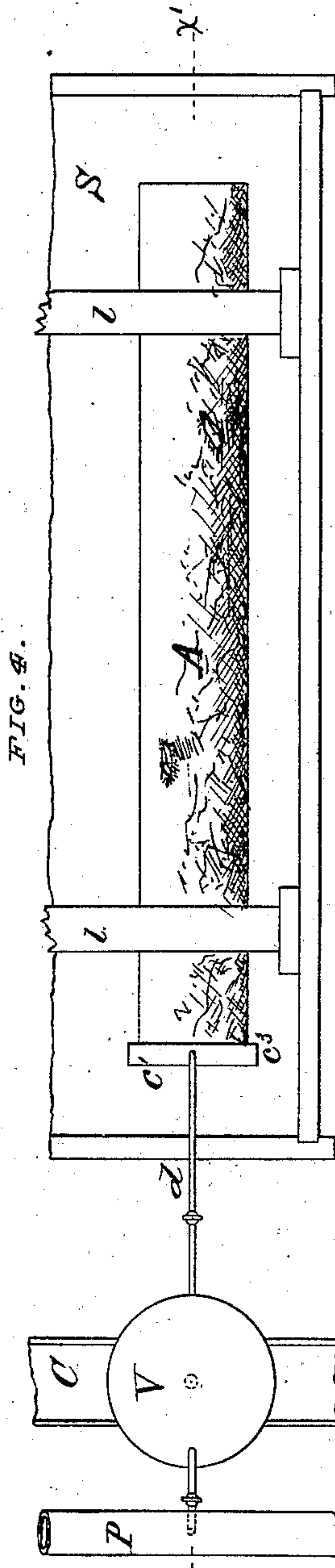
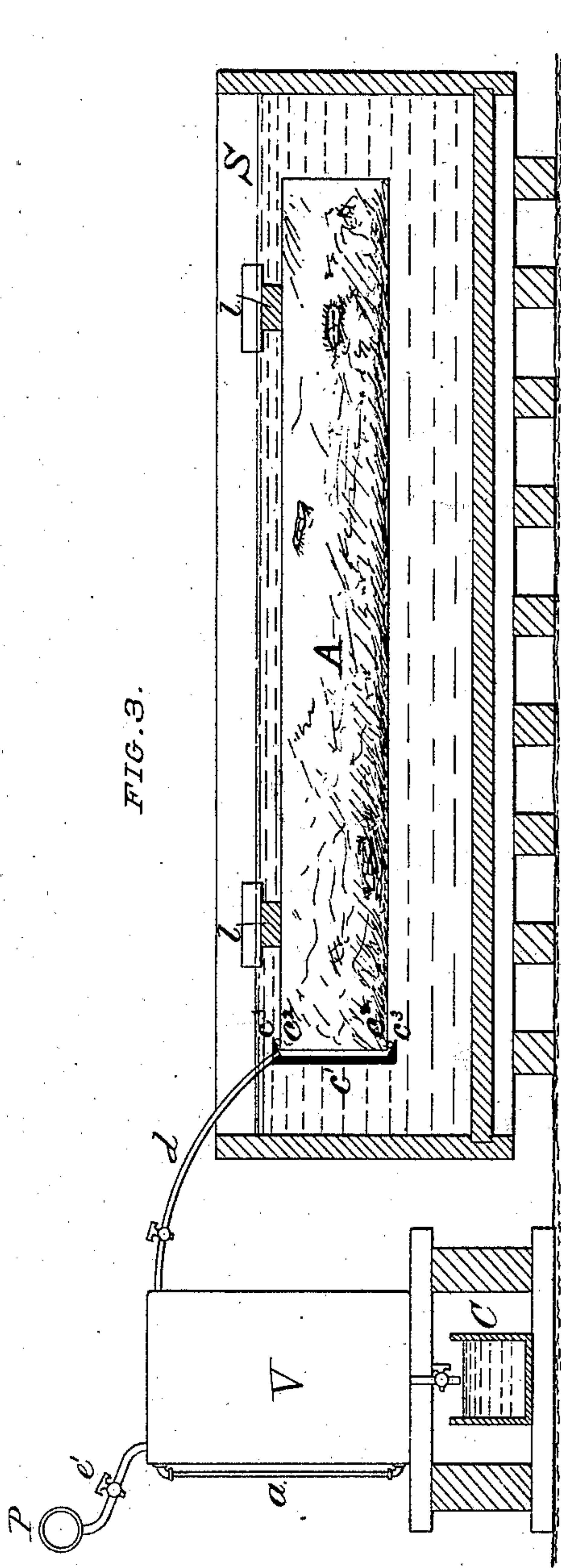
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Walter Allen

INVENTOR:

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By Knight & Bro.
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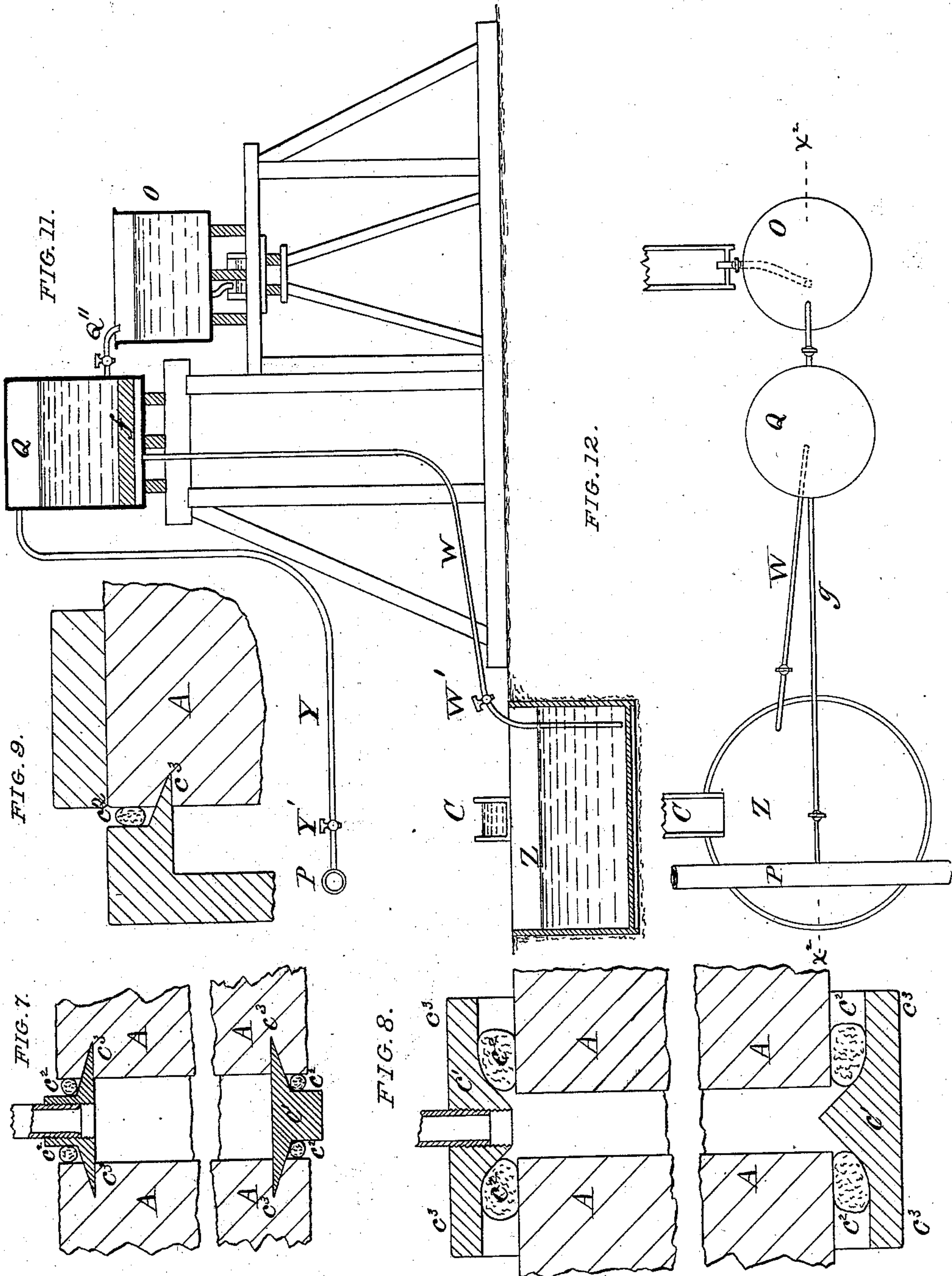
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UNITED STATES PATENT OFFICE.

HENRY FLAD, OF ST. LOUIS, MISSOURI.

PROCESS FOR PRESERVING TIMBER.

SPECIFICATION forming part of Letters Patent No. 231,784, dated August 31, 1880.

Application filed April 2, 1880. (Model.)

To all whom it may concern:

Be it known that I, HENRY FLAD, residing at the city of St. Louis, in the State of Missouri, have invented Improvements in Processes for Preserving Timber, of which the following is a specification.

The main cause of the decay of timber lies in the albumen contained in the sap.

To preserve timber from decay it is therefore of first importance to remove the sap, or to coagulate the albumen by heat or antiseptic substances. The latter, such as corrosive sublimate, sulphate of copper, and chloride of zinc, have the further advantage of acting as poisons to vegetable and animal spores and germs which might in time be carried into the wood and produce decay of the fiber. The timber, in order to preserve it, is therefore freed from sap as far as possible and thoroughly impregnated with an antiseptic. As some antiseptics are liable to wash out by rain, &c., the timber is sometimes impregnated successively, with two different salts whose ingredients may form new combinations inside the timber, one of which acts as an antiseptic, while the other, being insoluble in water, prevents the washing out of the antiseptic.

Among the different methods which have been adopted for removing the sap from timber and impregnating its pores with an antiseptic, the Boucherie process is one of the most effective. By it the tree, as soon as possible after having been cut down, is sawed into logs of proper length without removing the bark. A greased rope is then placed on one end just inside the bark, and a plank held by clamps is placed over the rope, so as to form a kind of a cap on the end of the log, into which the impregnating solution is introduced through a tube which passes either through the cap or through a slanting hole bored in the log near its end and opening into the inside of the cap. The impregnating solution, which is contained in a vessel placed at some elevation above the log, is introduced into the cap through a hose, and entering the pores of the wood drives the sap before it, and finally thoroughly impregnates the wood with the antiseptic. (Sulphate of copper is used by Boucherie.) This process has some very important advantages. It requires hardly any

plant, and that of a very simple character. It can, at small expense, be applied close to where the timber grew, and within a short time after it has been cut, while the sap is in a viscid state and easily removed. It secures a more thorough and complete removal of the sap and impregnation than almost any other process, and it does not weaken the strength of the timber, (like steaming.)

On the other hand this process is open to several objections:

First, it is applicable only to treatment of round timber.

Second, some portions of the logs which have been impregnated are lost when they are sawed into square pieces, and with them the antiseptic contained therein.

Third, the process takes from forty-eight to one hundred hours, according to the length of the logs, to complete the treatment, while treating the timber in close vessels with vacuum and pressure requires only from twelve to twenty-four hours, and even less for small pieces.

Fourth, the pressure of the solution in the chamber within the cap, which is proportional to the elevation of the tank above the log, tends to push the cap away from the log and to open the joint between them, and it is therefore almost impossible to prevent leakage.

To retain the best features of the Boucherie process, and to eliminate some of its defects, is one object of my invention.

My mode of preserving timber consists in immersing round or square logs in a bath of antiseptic solution and exhausting the air from one end of each log by means of a vacuum-cap connected by a pipe with an air-pump or other suction device; or, in lieu of the cap, I employ a ring provided with suitable packing and an exhaust-pipe to form a vacuum-chamber between the adjacent ends of two logs placed end to end, with the vacuum-ring interposed.

The complete immersion of the logs in the antiseptic liquid gives said liquid free access not only to the uncovered ends of the logs, but also to all the exposed or open pores in the sides, so that by exhausting the air from one end of each log the liquid is caused to rapidly permeate the entire body of the wood.

In the drawings, Figure 1 is an elevation, with parts in section at *x x*, Fig. 2. Fig. 2 is

a top view with the top of chamber omitted. Fig. 3 is an elevation of an open-tank apparatus, with parts in section at $x' x'$, Fig. 4. Fig. 4 is a part top view of the same. Fig. 5 is an enlarged detail section of part of Fig. 1, and Fig. 6 is a modification of the same. Figs. 7 and 8 are detail sections illustrating forms of metal caps for use in treating two logs of similar section at one operation. Fig. 9 is an enlarged part section of cap shown in Fig. 6. Fig. 10 is an enlarged detail section of part of the cap shown in Fig. 3. In Figs. 6 to 10, inclusive, the cap is preferably of metal. Figs. 11 and 12 show the apparatus for filtering the liquid collected in vessel V before using the liquid again, Fig. 11 being a sectional view at $x^2 x^2$, Fig. 12. Figs. 1 and 2 show the general arrangement of the apparatus for treating timber in a close chamber.

A represents the log to be treated, and S a tank or chamber containing the antiseptic liquid in which it is immersed. $m m$ are skids on which the log rests.

T is a trough in which the liquid to be passed through the log is contained, resting on a trestle, $t t$.

V is an air-tight vessel into which the water, sap, and antiseptic fluid are drawn after passing through the log.

C is a trough into which the sap is drawn off from the vessel V after the said vessel is full. The end of this trough is provided with gates, so that the fluid passing through it may be allowed to run to waste or collected in a cistern, Z. (Shown in Figs. 11 and 12.)

$i i$ is a hose (with a cock, i' , at its lower end) leading from the bottom of the trough T to the interior of the tank S.

$d d$ is a hose with a cock, d' , leading from the delivery-cap c' to the vessel V.

a is a water-gage, to show the height of the fluid in vessel V.

c^2 is an annular packing of greased rope, rubber, or any other suitable compressible material between the cap c' or c and the end of the log.

$h h$ are cross-heads, and $r r$ side rods, with screw-nuts $r' r'$, for the purpose of holding the caps in position.

The metal caps shown in Figs. 3, 4, 6, 7, 8, 9, and 10 have circular or other flanges c^3 , which, in Figs. 3, 4, 8, and 10, lap past the edges of the timber and are packed in an air-tight manner to the log with packing-rim c^2 , while in Figs. 6, 7, and 9 the flange comes to an edge that enters the grain of the wood to make a tight joint. The packing c^2 may be added even here.

P is a pipe or other air-tight reservoir, in which the air is kept exhausted by means of an air-pump or inspirator.

Instead of the caps as shown in Figs. 1 and 2, and represented on a large scale in Fig. 5, a metal cap, as shown in Figs. 6, 9, and 10, may be used; or, when two logs of the same diameter or section are treated at the same time, a ring-like head (shown in Figs. 7 and 8) may

be used for the discharging-cap of two logs, while for the receiving-caps those shown in Figs. 5, 6, and 9 may be selected.

The *modus operandi* is as follows: The log A (or two logs end to end) is placed on the skids $m m$, the caps $c c'$ being placed on the ends and held in position by the cross-heads $h h$, with rods $r r$, or by any other method. The trough T is filled with liquid, and the connection between the trough T and the chamber S made by attaching the hose $i i$ to a short pipe passing into the chamber S near its top. The cock at i' is then opened, and after the air has passed out through it and the fluid percolated from the trough through the hose $i i$ the chamber S will be completely filled with the fluid. After allowing the fluid in chamber c for some time to act on the log, the discharging-cap c' is, by means of the hose d , connected with the vessel V. The cock d' is then opened, as well as cock e' , and the sap and fluid coming from the log A are drawn into the vessel V, in which a vacuum is formed by means of the pipe P, which is connected with an air-pump. When the vessel V is nearly filled, as shown by the glass gage, the cock d' is closed and the cock s opened, three-way cock e' set so as to admit common air to the top of the fluid in vessel V, and the fluid collected in vessel V is allowed to run off into trough C, either to be wasted or to be collected in a cistern, at pleasure. The operation of drawing the fluid through the log is then repeated, and may be made continuous by connecting the discharge-cap c' with another exhausted vessel as soon as the vessel V is filled. After the necessary quantity of the antiseptic fluid has passed through the log the process is complete.

The method of treating barked round timber or sawed sticks in an open tank is shown in Figs. 3 and 4, in which A represents the log or square stick to be treated.

S S is a shallow tank filled with the antiseptic fluid, in which the stick is kept submerged by the movable bars $l l$. V is the receiving-vessel. P is the pipe in which vacuum is maintained. d is the hose connecting the discharging-cap c' with vessel V, (with cock d' .) e' is the hose connecting the vessel V with exhaust-pipe P.

The forms of cap c' shown in Figs. 5, 6, and 9 may be used for the discharge-caps for round timbers. The preferred form of caps for square sticks is shown in Figs. 3 and 10, where a single length of stick is treated; but where two sawed sticks, being in a line, and with their end sections close together, can be treated at the same time, I use the double cap shown in Figs. 7 and 8.

The *modus operandi* is as follows: The shallow tank S is filled with the fluid which is to be drawn through the log or stick. The log, with the discharging-cap c' fixed to it, is submerged, and the cap c' connected with the vessel V by the hose d . The fluid in the tank is then drawn by suction through the log or stick

A, not only from the end K of the stick, but through any place where the pores of the wood come to its outside surface. The cap may then be placed at the other end and the operation 5 repeated.

The collection and disposal of the fluid after passing through the timber are the same as with the first method.

When, in applying either of the above methods, the antiseptic fluid is used before the sap is thoroughly washed out by the use of pure water, it becomes necessary to filter the mixture of sap and antiseptic which may be collected in the cistern Z (see Figs. 11 and 12) 10 before again using the solution. For this purpose a filter is placed in the air-tight vessel Q, (which latter is placed somewhat higher than the vessel O,) in which the fluid is brought to its normal strength after having left a part 15 of its antiseptic matter during its passage through the timber.

The pipe Y connects vessel Q with the exhaust-pipe or reservoir, and the pipe W W connects it with the cistern.

25 To filter the fluid contained in the cistern the cock Y' in pipe Y is opened, which produces a partial vacuum in the vessel Q. The cock W' in pipe W is then opened, and the fluid from cistern Z drawn through pipe W and filtering material *f* until the vessel Q is 30 filled. Then the cock W' is closed and the three-way cock Y' is opened to admit air into vessel Q above the liquid, and cock Q'' in vessel Q opened. After the fluid has been thus 35 discharged into vessel O the operation is repeated; or it may be made continuous by using two vessels Q, one of which is being filled through the filtering material while the other is being discharged.

By the described process, first, square or irregular timber can be treated; second, thus 40 the loss incident to round timber is avoided; third, the time required for treatment is reduced; fourth, the loss of the antiseptic caused by leaky joints is avoided; and, fifth, all the 45 good features of the Boucherie process are retained.

The described apparatus, or a very slight modification of the same, is applicable to the seasoning of timber by passing dry air through 50 the pores of the timber. To illustrate: Air dried by a furnace or by passing through a chamber containing sulphuric acid or any chemical having a strong affinity for moisture may be applied to the chamber of cap *c* and 55 drawn through the timber by suction in the manner described—*i. e.*, by cap *c'* and pipe *d*, in communication with the vacuum-pipe P.

The packed ring for forming a vacuum-chamber between the adjacent ends of two logs 60 placed in line is made the subject of a claim in another application for Letters Patent for my mode of seasoning timber.

I am aware that it is not new to treat timber by immersing it in a bath of antiseptic 65 liquid under pressure.

Having thus described my invention, the following is what I claim as new and desire to secure by Letters Patent:

The mode herein described of preserving 70 timber, by means of exhaustion or suction at one end of each piece of timber under treatment while the said timber is immersed in an antiseptic solution, substantially as set forth.

HENRY FLAD.

Witnesses:

SAML. KNIGHT,
GEO. H. KNIGHT.