(No Model.) 3 Sheets—Sheet 1.

P. H. DUDLEY.

APPARATUS FOR IMPREGNATING WOOD.

No. 381,682. Patented Apr. 24, 1888.

Fig. 2.

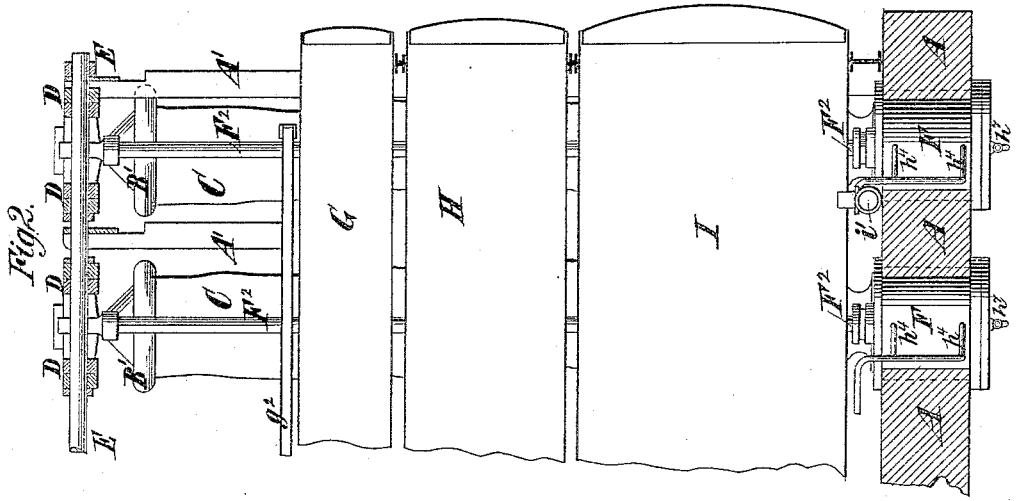
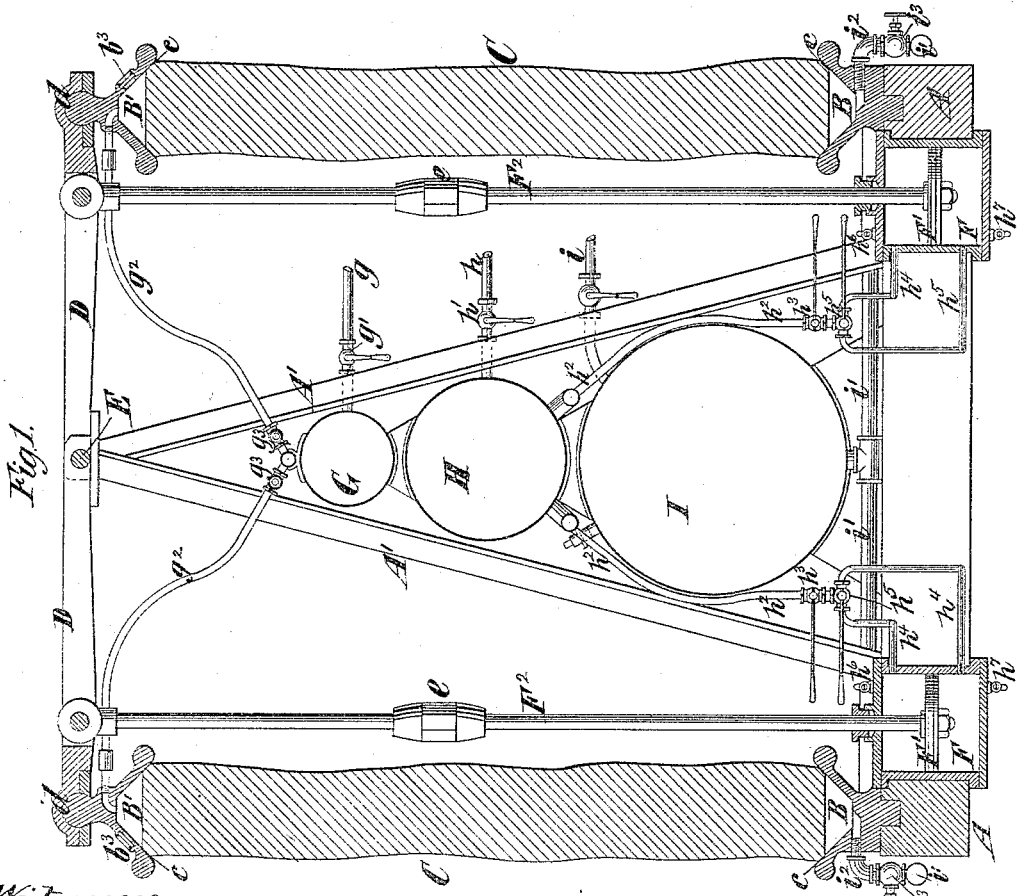


Fig. 1.



Witnesses.
Emil Horter.
Henry McBride.

Inventor.
Plimmon H. Dudley.
by his attys
Brown & Hall.

(No Model.) 3 Sheets—Sheet 2.

P. H. DUDLEY.

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Fig. 5.

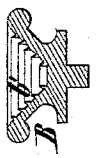


Fig. 3

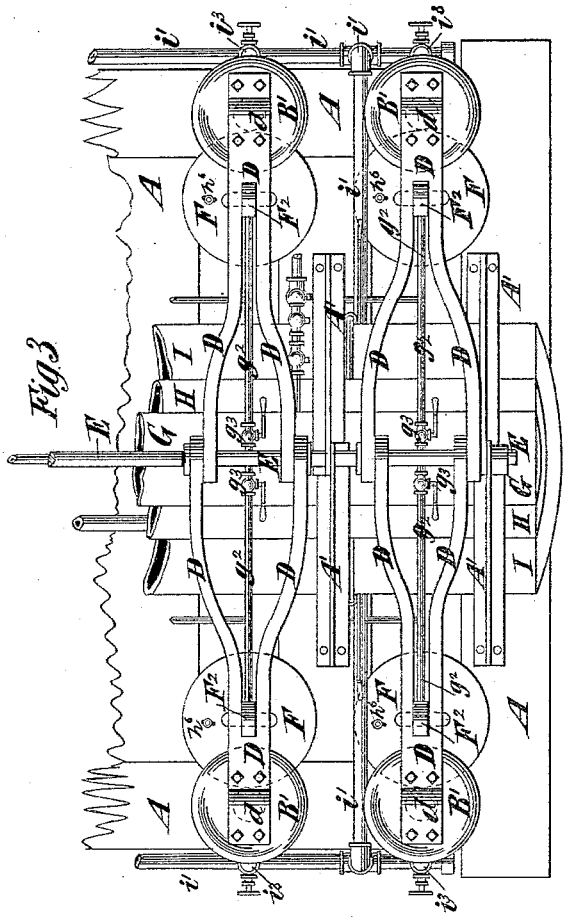
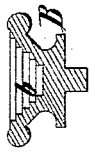


Fig. 4.



Witnesses.
Emil Horter
Henry McBride

Inventor.
Plimmon H. Dudley
by his Attys.
Brown & Hall

(No Model.) 3 Sheets—Sheet 3.

P. H. DUDLEY.

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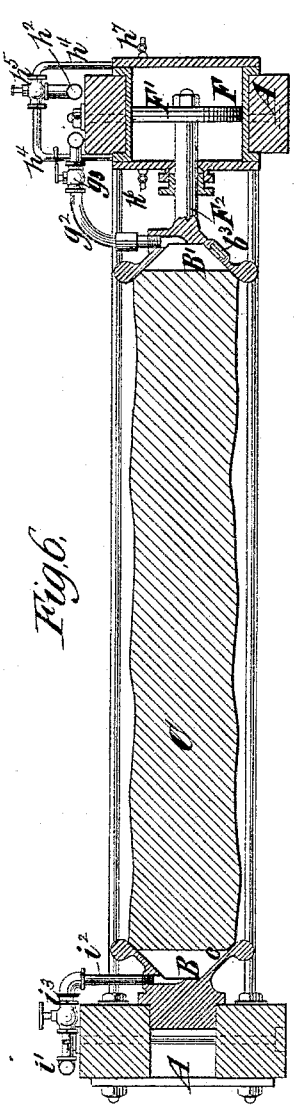

Fig. 6.

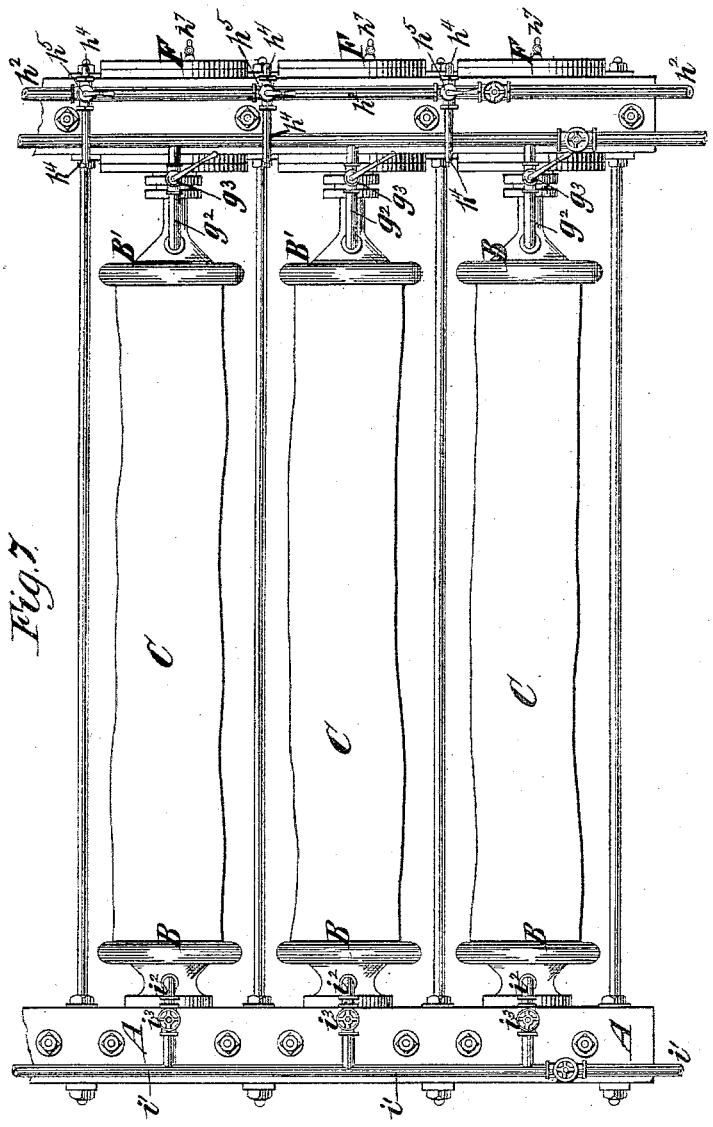

Fig. 7.

Witnesses
Emil Herter.
Henry McBride

Inventor.
Plimmon H. Dudley.
by his Attys.
Brown & Hall

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

PLIMMON H. DUDLEY, OF NEW YORK, N. Y.

APPARATUS FOR IMPREGNATING WOOD.

SPECIFICATION forming part of Letters Patent No. 381,682, dated April 24, 1888.

Application filed September 15, 1885. Serial No. 177,147. (No model.)

To all whom it may concern:

Be it known that I, PLIMMON H. DUDLEY, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Apparatus for Impregnating Timber, of which the following is a specification.

My improved apparatus may be employed for impregnating with liquid or gases timber of various kinds and in pieces or sticks of various sizes, and it is particularly useful in so impregnating railway-ties.

My invention relates to the class of apparatus above described, in which are combined two oppositely-arranged sockets or heads to receive opposite ends of a stick of timber, means whereby the two sockets or heads may be caused to make tight contact with the ends of the stick, so that fluid cannot escape, and a pipe connected with one socket or head for supplying fluid thereto to be forced by pressure through the stick, and a pipe connected with the other socket or head for exhausting from the opposite end of the stick the natural fluids and gases contained in the wood.

The object of my invention is to provide an apparatus which may be supported and carried by a car or set up in any locality where the timber is cut or is to be treated, and by which the impregnation of the timber may be rapidly performed in a very thorough manner.

The invention consists in novel combinations of parts and details of construction, which are hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a transverse vertical section of an apparatus embodying my invention, and in which the timber is treated while in an upright position. Fig. 2 is a side elevation showing a portion of the length of the apparatus. Fig. 3 is a plan of a portion of the length of the apparatus. Figs. 4 and 5 are sectional views showing sockets or heads of modified forms which may be employed. Fig. 6 is a sectional view of parts of an apparatus embodying my invention, and in which the timber may be treated while in a horizontal position, if desired; and Fig. 7 is a plan of a portion of the length of the apparatus shown in Fig. 6.

Similar letters of reference designate corresponding parts in all the figures.

I will first describe the form of apparatus shown in Figs. 1, 2, and 3, and which is designed to treat the ties or timber while in an upright position.

A designates the base-frame, which may be of wood or metal and of any desired length, and B B′ designate pairs of sockets or heads, which are arranged in line one above another, and are placed at any suitable distance from each other, as here represented, along opposite sides of the apparatus, the object being to provide a plant which may be employed to treat a considerable number of ties or sticks of timber at once. As here represented, the base-frame A is designed to be stationary; but the apparatus may be mounted upon a platform-car, so as to be readily conveyed from place to place along the railway.

The sockets or heads B B′ may be of cast metal and have conical faces, so that they will readily receive ties or sticks of timber, C, of different sizes. The ends of the sticks, before introducing them into the apparatus, may be chamfered off, as indicated at *c*, to give them the same taper as the conical faces of the sockets or heads B B′. Instead of making the sockets or heads with a smooth taper, they may be made with a series of annular steps or projections, as shown in Fig. 4, in which case the ends of the stick to be operated upon would be sawed off square and would rest upon one or other of the annular steps or projections *b*, according to its size.

I have represented in Fig. 5 another form of socket or head which may be employed. This latter is provided upon its face with annular sharp-edged ribs or projections *b′*, and the tie or stick to be received therein is sawed off square, and the ribs or projections will enter the end thereof, and so form a fluid-tight joint between the tie and socket or head. As here represented, the lower sockets or heads, B, are securely fixed in position upon the base-frame A, and the upper heads or sockets, B′, are carried at the ends of levers D, which have a ball-and-socket connection, *d*, with the upper sockets or heads. This form of connection between the levers and upper sockets or heads enables the latter to readily adapt themselves to the ends of the sticks of timber C.

A′ designates triangular frames, two or more of which may be arranged at suitable distances

apart in the length of the apparatus, and which carry at their upper ends a rod or bar, E, extending longitudinally above the apparatus.

The levers D are forked or bifurcated, as best shown in Fig. 3, and their inner ends have a broad bearing upon the rod or bar E, which forms the fulcrum on which the levers swing. The mechanism for operating the upper sockets or heads to force them in fluid-tight contact with the upper ends of the sticks, and to force the lower ends of the sticks in fluid-tight contact with the lower sockets or heads may be of any suitable character.

I have here represented motors which are to be operated by compressed air for this purpose. F designates the cylinders of these motors, which are employed one for each pair of sockets or heads, and F′ designates the pistons thereof, which are connected by rods F^2 with the levers D. These rods F^2 may be provided with turn-buckles *e* or equivalent means for varying their length, so that the range of movement of the piston will always suffice to securely fix the tie or stick C in place.

If pressure be applied to the under side of the piston, the latter will be forced upward, thereby lifting the corresponding lever, D, and upper head or socket, B′, to enable the tie or stick to be placed in position in the apparatus or removed therefrom. If after the tie is placed in position pressure be applied above the piston F′, the latter will be forced down, lowering the socket or head B′ upon the top of the tie and forcing the tie downward into the lower socket or head, thereby producing a fluid-tight contact of both sockets or heads with the ends of the tie.

G H I designate, respectively, a vacuum-cylinder, an air-pressure cylinder, and a fluid cylinder or reservoir, all of which are here represented as supported by the base-frame A, and in the space between the legs or portions of the upright frames A′. In lieu of being supported upon the same frame with the other parts of the apparatus, these several cylinders or reservoirs may be arranged in any other suitable position.

A vacuum is to be maintained in the cylinder G by means of an exhauster or air-pump, which may be of any suitable character, but is not here represented. It may be connected with the cylinder G by a pipe, *g*, in which is a cock or valve, *g′*. A pressure of air of the required degree may be maintained in the cylinder or reservoir H by an air-compressor suitably arranged or connected with said cylinder or reservoir by a pipe, *h*, in which is a cock or valve, *h′*. The antiseptic fluid which is to be employed may be supplied to the cylinder or reservoir I through a pipe, *i*. Compressed air is taken from the cylinder or reservoir H by means of a pipe, h^2, in which is a cock or valve, h^3, for regulating its passage, and is supplied by branch pipes h^4, controlled by a suitable cock or valve, h^5, to the opposite ends of each cylinder F above and below the piston. By operating the cock or valve h^5 air-pressure may be admitted either above or below the piston or shut off entirely from the cylinder. I have represented in the upper head of each cylinder a cock or valve, h^6, and in the lower head thereof a cock or valve, h^7, the purpose of which will be hereinafter described. The vacuum cylinder or reservoir G is connected by flexible pipes g^2, in which are suitable cocks or valves, g^3, with the upper sockets or heads, B′. The fluid reservoir or cylinder I is connected by main pipes *i′* and branch pipes i^2, in which are suitable valves, i^3, with the lower sockets or heads, B.

The operation of the apparatus is as follows: The sticks or ties C are first centered and chamfered, if the form of sockets or heads shown in Fig. 1 be employed. The air cocks or valves h^5 are now turned to admit compressed air below the pistons F′, and the upper sockets or heads are thereby raised sufficiently to permit of the ties or sticks C being placed in the apparatus. The cocks h^7 in the lower cylinder-head are now opened and the valves h^5 are turned to admit air-pressure above the pistons, and the latter are then forced down, bringing the upper sockets or heads, B′, in fluid-tight contact with the upper ends of the sticks and the lower sockets or heads, B, in fluid-tight contact with the lower ends of the sticks. The valves g^3 in the vacuum-pipes g^2 are now opened and the exhaustion applied to the upper ends of the sticks, thereby removing from them the natural gases and fluids, and at the same time the cocks or valves i^3 are opened, so as to supply fluid from the reservoir I to the lower ends of the sticks. By reason of this application of fluid to the lower ends of the sticks simultaneously with the exhaustion applied to the upper ends of the sticks the fluid will be caused to find its way into all the cells and pores of the wood, and the latter will become completely penetrated and impregnated in its every part by the fluid. This operation is continued until it is seen that the impregnation is complete, which may be readily discovered by the glass peep-holes b^3 in the upper sockets or heads, B′. If a second chemical or substance is to be injected into the tie, additional pipes provided with suitable valves are connected with the lower sockets or heads, B.

After the impregnation of the tie is complete the pressure in the cylinder F is equalized on both sides of the piston by the valves h^5, and the cocks h^6 in the tops of the cylinders are opened, thereby relieving the pressure above the pistons and enabling the expansion of air on the under sides of the pistons to raise the sockets or heads B′, and the ties are then removed. In this way but a small quantity of air is lost each time a tie is put in and removed and less compressed air is required to operate the motor.

By means of this apparatus timber may be treated at any time, whether dried or green; but I prefer to impregnate the timber with the bark upon it, and soon after it is cut and while in a green state.

In the example of my invention shown in Figs. 6 and 7 the main parts of the apparatus are similar to those before described, and the same description applies to them, like letters of reference being employed to indicate similar parts. This apparatus is intended to treat the ties while in a horizontal position and differs chiefly from that before described in having the piston-rods F^2 attached directly to the movable sockets or heads B′ without the intervention of any levers or other connections.

I have not represented the vacuum, pressure, and fluid reservoirs in Figs. 6 and 7, as they may be arranged in any suitable position relatively to the parts of the apparatus shown, and connected with the sockets or heads and cylinders F by means of pipes similar to those before described.

From the above description it will be seen that by my invention I provide a simple and compact apparatus which may be employed to completely impregnate the ties or other sticks of timber with antiseptic fluid, and which will perform its work very rapidly and economically.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an apparatus for impregnating timber, the combination, with two sockets or heads to receive the ends of the stick, of a motor having a cylinder and piston, and connections whereby one socket or head is operated by the motor to hold the sockets or heads in fluid-tight contact with the ends of the stick, and pipes connected with the sockets or heads, whereby fluid may be supplied at one end of the stick and exhaustion applied at the other end thereof, and a pipe connected with the motor-cylinder for supplying motive fluid thereto, substantially as herein described.

2. The combination, with sockets or heads having conical faces to receive the ends of sticks of different sizes, of a lever carrying one socket or head, a pressure-cylinder and a piston connected with said lever for forcing the sockets or heads in fluid-tight contact with the ends of the stick, and pipes connected with the sockets or heads, whereby fluid and exhaustion may be applied to opposite ends of the stick, substantially as herein described.

3. The combination, with a number of pairs of sockets or heads to receive the ends of sticks, and motors and connections for forcing the sockets or heads upon the ends of the sticks, of a frame or carriage supporting the aforesaid parts, a vacuum-cylinder, an air-pressure cylinder, and a fluid-reservoir upon said frame or carriage, and pipes and valves whereby air may be supplied to the several motors, and whereby fluid may be supplied to one socket or head of each pair and exhaustion applied to the other socket or head of each pair, substantially as herein described.

4. The combination, with the base-frame A and rows of sockets or heads B at opposite sides thereof, of the upper sockets or heads, B′, and their carrying-levers D, a center frame, A′, supporting the fulcrums for said levers, motor cylinders and pistons F F′, and rods F^2, connecting said pistons and levers, the fluid-reservoir I, and pipes and valves connecting it with the lower sockets or heads, the pressure-cylinder H, and pipes and valves connecting it with the motor-cylinders, and the vacuum-cylinder G, and pipes and valves connecting it with the upper sockets or heads, B′, substantially as herein described.

PLIMMON H. DUDLEY.

Witnesses:
C. HALL,
FREDK. HAYNES.