

No. 716,401.

Patented Dec. 23, 1902.

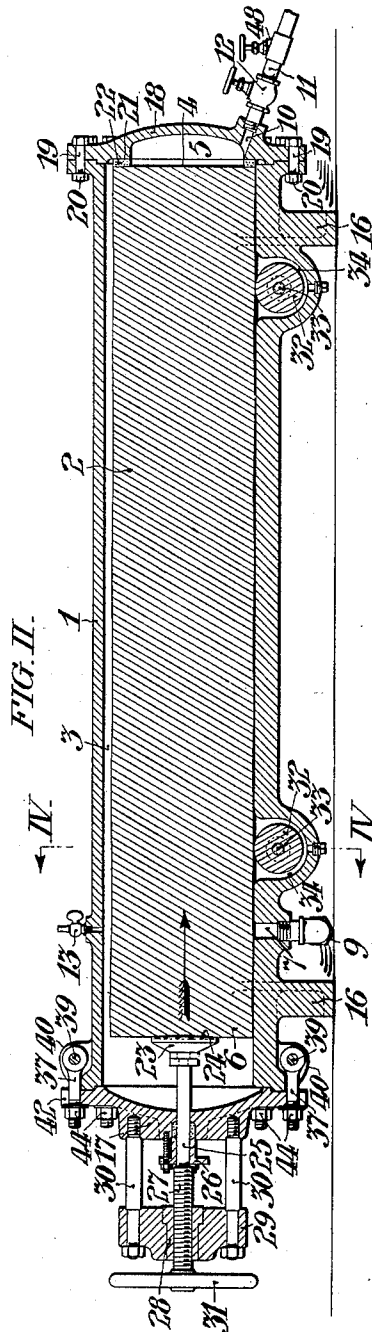
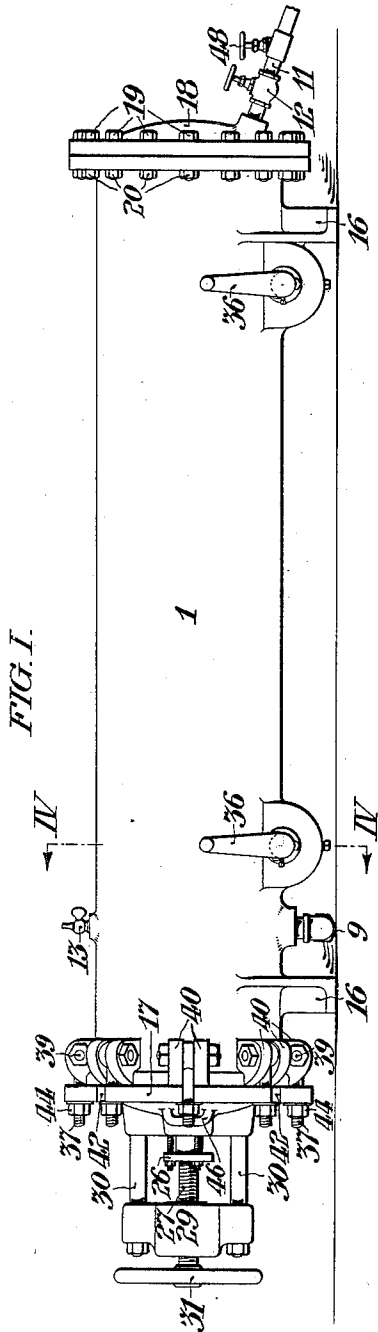
J. L. FERRELL.

APPARATUS FOR IMPREGNATING WOOD.

(Application filed June 20, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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FIG. III.

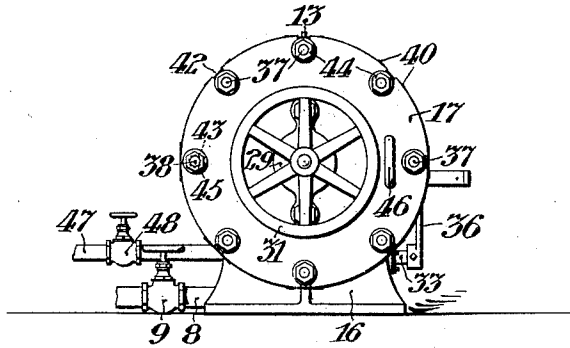
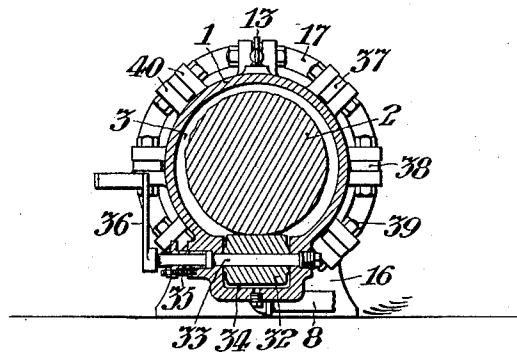


FIG. IV.



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# UNITED STATES PATENT OFFICE.

JOSEPH L. FERRELL, OF PHILADELPHIA, PENNSYLVANIA.

## APPARATUS FOR IMPREGNATING WOOD.

SPECIFICATION forming part of Letters Patent No. 716,401, dated December 23, 1902.

Application filed June 20, 1901. Serial No. 65,283. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH L. FERRELL, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Impregnating Wood with Fireproofing Preservative and other Reagents, whereof the following is a specification, reference being had to the accompanying drawings.

It is the object of my invention to provide an apparatus comprising a receptacle wherein a body of wood may be inclosed and impregnated by injecting a fluid-reagent there-through, under pressure at one end thereof, in the direction of the grain of the wood. It is characteristic of my present invention that said impregnating-receptacle is provided with means to seclude one end of a body of wood inserted therein, so that the pressure to which that portion of said body is subjected within said receptacle may be independently controlled.

My invention consists in the novel features of construction and arrangement hereinafter specified and claimed.

The particular employment of my apparatus which I at present contemplate is in connection with the fireproofing of wood, and I will therefore simplify the following description by adverting only to such use thereof, it being understood, however, that I do not therefore intend to limit my claims accordingly.

In the drawings, Figure I is a side elevation of an apparatus conveniently embodying my invention. Fig. II is a longitudinal sectional view of said apparatus. Fig. III is an elevational view of the left-hand end of said apparatus as shown in Fig. I. Fig. IV is a transverse sectional view taken on the line IV IV in Figs. I and II.

In said figures, 1 is the impregnating-receptacle, adapted to inclose a wooden body 2 within the space 3 and to seclude the end 4 of said body from said space 3 in exclusive communication with the space 5, so that a fluid reagent may be injected in the end 6 of said body 2 from said space 3 through the grain-pores of the body 2 and be vented at the end 4 thereof while said body is surrounded by said fluid in the space 3. Said receptacle is provided with the port 7 for the space 3,

which port opens into the pipe 8, controlled by the valve 9, and the port 10 for the space 5, which opens into the pipe 11, controlled by the valve 12. The space 3 is also in communication with the air-valve 13, leading to the atmosphere.

It is to be noted that the rapid injection of a fluid through the grain-pores of a wooden body in the direction of the grain of the wood has a tendency to open fissures in said body on the lines of the medullary rays, and the arrangement above-described is advantageous in that the fluid is not only injected in the end 6 of the body 2 in the direction of the grain-pores, but also incloses the circumference of said body, and serves as a hydrostatic band to compress the latter and prevent development of such fissures.

The impregnating-receptacle 1 is mounted upon the standards 16 and provided with the removable lids 17 and 18. The lid 18 is secured in fluid-tight relation with the receptacle 1 by means of the bolts 19 and nuts 20, and the space 5 is conveniently recessed in said lid. Said lid 18 is provided with the annular flange 21, which supports the gasket 22 in position to contact with the perimeter of the end face 4 of said body 2, so that said end is sealed and secluded by compression of said gasket when the body 2 is thrust in the direction of the arrow shown in Fig. II.

In order to effect the aforesaid endwise movement of the body 2, a thrust-plate 23, comprising the corrugated face 24, (to give free passage to fluid,) is opposed to the end 6 of said body 2 in swiveled connection with the thrust-bar 25, which latter is entered through the stuffing-box 26 in the lid 17 in longitudinally-adjustable relation therewith. The outer extremity of said thrust-bar 25 is provided with the screw-thread 27 in engagement with the nut 28, which latter is fixed in the yoke 29, rigidly connected with the lid 17 by the bolts 30, and said thrust-bar, being also provided with the hand-wheel 31, may be rotated in said nut 28 to shift said bar in or out through the head 17. Said wooden body 2 is conveniently supported by the rollers 32, which are respectively fixed to the shafts 33 and mounted to rotate in the recesses 34 in the bottom of the receptacle 1. Said shafts 33 extend through stuffing-boxes

35 and are provided upon their outer extremities with cranks 36, by which the rollers may be conveniently actuated to shift the body 2 with respect to the receptacle 1.

5 The body of wood 2 is inserted and removed with respect to the receptacle 1 through the end thereof provided with the lid 17, and said lid is arranged to be compressed upon the receptacle 1 in fluid-tight relation there-  
10 with by means of the swing-bolts 37 and 38, which are respectively pivoted at 39 between bearing-lugs 40 at the extremity of the receptacle 1. The bolts 37 respectively register with the notches 42 in the periphery of the lid 17, and the bolt 38 is entered through  
15 the aperture 43 in said lid. Said bolts 37 and 38 are respectively provided with nuts 44 and 45, arranged to compress said lid 17 upon the receptacle 1, or, being retracted upon their  
20 respective bolts 37 and 38, the bolts 37 may be swung upon their pivots 39 clear of the notches 42 and the lid 17 opened by means of the handle 46, said lid being hingedly connected with the receptacle 1 by the bolt 38.  
25 The apparatus above described may be employed to impregnate a body of wood by injecting a fluid reagent through its grain-pores under pressure at one end thereof, as follows: The lid 17 being opened, a wooden body  
30 2 may be inserted in the receptacle 1, with its end face 4 presented in contact with the gasket 22, conveniently by rotation of the rollers 32. The thrust-bar 25 being then withdrawn, so as not to contact with the end  
35 face 6 of said body 2, the lid 17 is swung upon the bolt 38 into its closed position, the bolts 37 are placed within the notches 42, and the nuts 44 and 45 rotated to compress the lid 17 in fluid-tight relation with the re-  
40 ceptacle 1. Thereupon the hand-wheel 31 is rotated to bring the thrust-plate 23 in contact with the face 6 of the body 2, and thereafter to thrust said body in the direction of the arrow upon Fig. II to compress the gas-  
45 ket 22, so that the latter seals the end face 4 of the body 2 in exclusive communication with the recess 5 and the port 10 leading therefrom. The parts aforesaid having been assembled as described, the valve 12 is opened  
50 to vent the recess 5 at the end 4 of the body 2, and the air-valve 13 is opened to vent the space 3 surrounding the remainder of said body within the receptacle 1. Thereupon any suitable reagent fluid—such, for instance,  
55 as an aqueous solution of metallic salt—is admitted through the valve 9 and port 7 to the space 3 within the receptacle 1, from which the atmospheric air is permitted to vent at the valve 13 until the receptacle is  
60 fully charged with the reagent fluid, whereupon said valve 13 is closed, and the recess 5 being open to discharge through the port 10 and valve 12 the continued injection of the reagent through the port 7 effects the distribution of said reagent from the end 6 of  
65 the wooden body 2 through its grain-pores to the end 4 thereof. The fluid which is first

emitted from the discharge end 4 of the wooden body 2 comprises any fluid previously existing in said body, such as water of sap, &c., which is driven forth by the incoming reagent. However, as soon the fluid emitted from the grain pores at the discharge end 4 of the body 2 is of the full strength of the fluid injected at the initial end 6 of said body  
75 the further escape of said fluid through the port 10 is prevented by closure of the valve 12, and thereupon, the injection of the fluid being continued, the latter is forced radially outward from the grain-pores through the  
80 surrounding cellular structure of the body 2 to the circumference of the latter.

I find that after the grain-pores of a wooden body are impregnated from end to end thereof, as in the first step of the operation above  
85 described, the time required to effect the radial impregnation of the remaining cellular structure of said body is materially shortened by injection of the fluid within said body simultaneously from both ends thereof, and  
90 for this purpose the branch pipe 47 may be connected with the same supply of fluid as the pipe 8 and the backward flow of fluid through the port 10 be controlled by manipulation of the valves 48 and 12.

I do not desire to limit myself to the precise construction and arrangement of the apparatus which I have chosen for illustration, as it is obvious that various modifications  
95 made be made therein without departing from the essential features of my invention.

I claim—

1. The combination with an impregnating-receptacle; of means for opening and closing said receptacle, consisting of removable lids  
105 detachably secured to the opposite ends thereof; a gasket of resilient material within said receptacle supported by one lid thereof; means in the other of said lids arranged to adjustably thrust a body of wood within said  
110 receptacle, in the direction of its length, against said gasket; a fluid-port for the space surrounding said body within said receptacle; means to control said port; a fluid-port for the space inclosed by said gasket; means  
115 to control said port; recesses in the bottom of said receptacle; rollers respectively mounted to rotate in said recesses; and means, exterior to said receptacle, arranged to actuate said rollers, substantially as set forth.

2. The combination with an impregnating-receptacle; of means for opening and closing said receptacle, consisting of removable lids  
120 secured to the opposite ends thereof; a gasket of resilient material within said receptacle, supported by one lid thereof; means, in the other of said lids, arranged to adjustably thrust a body of wood within said receptacle  
125 against said gasket; a fluid-port for the space surrounding said body within said receptacle; means to control said port; a fluid-port for the space inclosed by said gasket; and means to control said port, substantially as set forth.

3. The combination with an impregnating-receptacle; of means for opening and closing said receptacle, consisting of removable lids secured to the opposite ends thereof; a gasket of resilient material within said receptacle, supported by one lid thereof; means, in the other of said lids, arranged to adjustably thrust a body of wood within said receptacle against said gasket; a fluid-port for the space surrounding said body within said receptacle; means to control said port; a fluid - port for the space inclosed by said gasket; means to control said port; a roller mounted to rotate in the bottom of said receptacle; and means, exterior to said receptacle, arranged to actuate said roller, substantially as set forth.

4. The combination with an impregnating-receptacle; of means for opening and closing said receptacle, consisting of removable lids secured to the opposite ends thereof; a gasket of resilient material within said receptacle, supported by one lid thereof; means, arranged within said receptacle, to adjustably thrust a body of wood against said gasket; a fluid-port for the space surrounding said body within said receptacle; means to control said port; a fluid-port for the space inclosed by

said gasket; and means to control said port, substantially as set forth.

5. The combination with an impregnating-receptacle; of removable lids for opening and closing said receptacle; a hinge connecting one of said lids with said receptacle; a gasket of resilient material, within said receptacle, arranged to seclude one end of a body of wood inserted therein; means, in said hinged lid, arranged to adjustably thrust a body of wood within said receptacle against said gasket; means to inlet and outlet fluid with respect to said receptacle; means to control the pressure of fluid at the secluded end of said body, independently of the remainder thereof; a roller mounted to rotate in the bottom of said receptacle; and means, exterior to said receptacle, arranged to actuate said roller, substantially as set forth.

In testimony whereof I have hereunto signed my name, at Philadelphia, Pennsylvania, this 17th day of June, 1901.

JOSEPH L. FERRELL.

Witnesses:

ARTHUR E. PAIGE,  
PHILIP PISTOR.