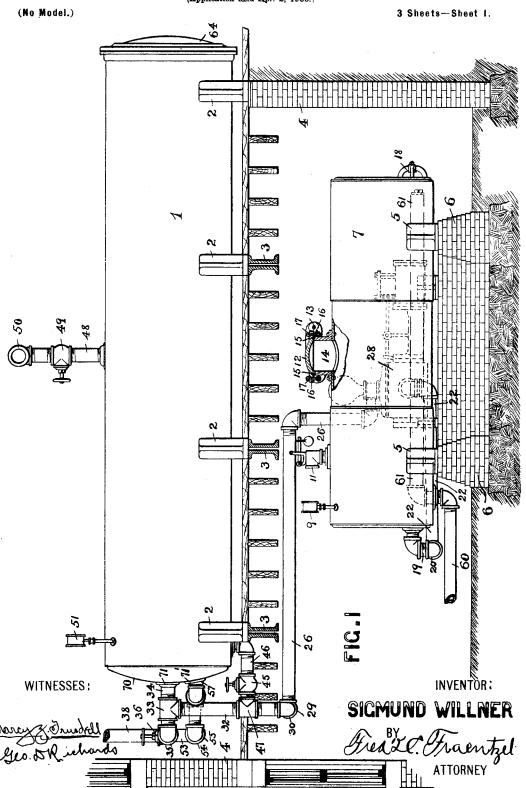
S. WILLNER.

APPARATUS FOR IMPREGNATING WOOD.

(Application filed Apr. 2, 1900.)



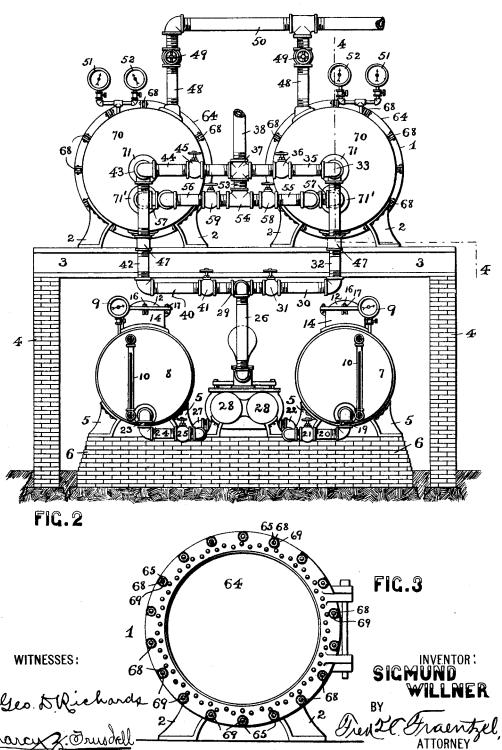
S. WILLNER.

APPARATUS FOR IMPREGNATING WOOD.

(Application filed Apr. 2, 1900.)

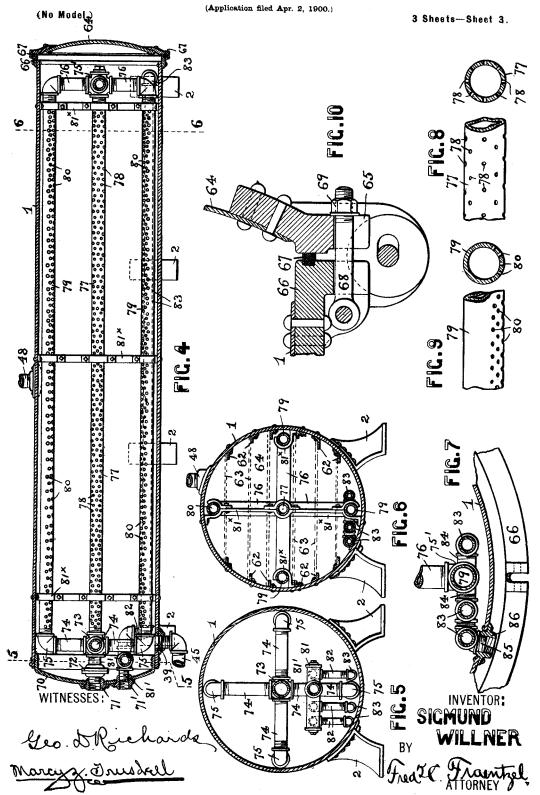
(No Model.)

3 Sheets-Sheet 2.



S. WILLNER.

APPARATUS FOR IMPREGNATING WOOD.



UNITED STATES PATENT OFFICE.

SIGMUND WILLNER, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO THE WILLNER WOOD COMPANY, OF NEW JERSEY.

APPARATUS FOR IMPREGNATING WOOD.

SYECUFICATION forming part of Letters Patent No. 676,060, dated June 11, 1901.

Application filed April 2, 1900. Serial No. 11,053. (No model.)

To all whom it may concern:

Be it known that I, SIGMUND WILLNER, a subject of the Emperor of Germany, residing at Jersey City, in the county of Hudson and 5 State of New Jersey, have invented certain new and useful Improvements in Apparatus for Impregnating Wood; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will 10 enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to numerals of reference marked thereon, which form a part of this specification.

My present invention has reference to a novel construction and arrangement of apparatus for properly treating wood with a mixture adapted to enter the pores of the wood, such mixture having excessive hardening 20 properties, whereby the wood is rendered resistible or tenacious to pressure and can be subjected to the action of a die or dies bearing a design and under proper pressure can be provided with an ornamentation in perfect 25 imitation of hand-carving without the least danger of distorting or tearing the fiber of the wood no matter whether the pressure is applied across or longitudinally with the grain of the piece, slab, or block of wood.

The apparatus forming the subject-matter of this invention is also applicable for the treatment of wood in the form of boards, slabs, blocks, or any other shape with a fireproofing mixture, whereby it is made perfectly 35 fireproof, and also for rendering wood water-

proof. My invention therefore has for its principal objects the production of a novel construction of apparatus for the treatment of wood there-40 in for the purposes above stated, and, in fact, for any other purposes, not here specifically mentioned, of preparing or treating wood prior to its being provided with a surface ornamentation in imitation of hand-carving or the 45 like, or for the impregnation of wood with a filler compound of any nature.

A further object of this invention is to provide a simple and operative device for thoroughly applying the mixture with which the 50 wood is to be treated over the entire surface

with such mixture, whereby considerable time and expense will be saved during the treatment of the wood and whereby the wood is rendered tenacious and resistible to pressure, 50 and, furthermore, deeper, sharper, and more clearly-defined ornamentations can be produced in the wood.

The invention therefore consists in the novel apparatus for the treatment of wood or 60 other material with a mixture or solution to render the wood tenacious or resistible to pressure or for fireproofing or waterproofing

The invention consists, furthermore, in the 65 several novel arrangements and combinations of the various devices and the parts thereof, all of which will be fully described in the accompanying specification and then finally embodied in the clauses of the claim which 70 form a part thereof.

My invention is fully illustrated in the accompanying sheets of drawings, in which-

Figure 1 is a side view of the apparatus for treating the wood and embodying the princi- 75 ples of this invention, and Fig. 2 is a front elevation of the same. Fig. 3 is an end view of the cylinder or tank in which the wood is placed for treatment. Fig. 4 is a longitudinal vertical section of the said cylinder, taken 80 on line 4 4 in Fig. 2. Fig. 5 is a cross-section taken on line 5 5 in said Fig. 4, and Fig. 6 is is a similar section taken on line 6 6 in said Fig. 4. Fig. 7 is a detail section, on an enlarged scale, of a certain arrangement of 85 spray and steam-heater pipes in the lower portion of the cylinder in which the wood is placed, illustrating also in connection therewith an exhaust-pipe, looking toward the rear of the cylinder. Figs. 8 and 9 are detail 90 views, on an enlarged scale, of sprayer-pipes; and Fig. 10 is a sectional view, on an enlarged scale, of a tightening means connected with the door at one end of the cylinder in which the wood is treated.

Similar numerals of reference are employed in all of the said above-described views to indicate corresponding parts.

In said drawings, 1 indicates one or more suitably-constructed cylinders or tanks suit- 100 ably supported on legs or supports 2, resting of the wood prior to the impregnation thereof | in the present case upon girders 3, which in

2 676,060

turn are supported by the foundation-walls 4. Suitably secured upon legs or supports 5, placed upon the foundations 6, are a pair of cylinders or tanks 7 and 8. Each cylinder or 5 tank 7 and 8 has a pressure-gage 9 and a glass gage 10, through which the height of the fluid in the tanks may be seen. Each cylinder or tank is also provided with a safetyvalve 11, substantially as shown in Fig. 2 of 10 the drawings. Each cylinder or tank 7 and 8 is also provided with a suitably-constructed cover 12, which is hinged, as at 13, to the dome 14 and can be securely closed down upon a packing or gasket 15 by the pivoted 15 bolts 16 and nuts 17, as will be evident from Fig. 2 of the drawings. Each cylinder or tank 7 and 8 is provided, preferably at the back, with a suitably-constructed cover 18 or other means providing a suitable opening for 20 cleaning out the said cylinders or tanks.

Connected with one end of the cylinder or tank 7, preferably at the front and at or near the bottom thereof, is a pipe 19, which connects with a pipe 20, having a valve 21. Said 25 pipe 19 is also connected, by means of a suitable pipe 22, with a suitably-constructed force-pump 28. Connected in like manner with the other cylinder or tank 8, preferably at the front and at or near the bottom, is a pipe 23, 30 which connects with a pipe 24, in which there is a valve 25. This pipe 24 is likewise connected by means of a pipe 27 with the forcepump 28. It will thus be evident that either of said cylinders 7 or 8 can be placed in direct 35 communication through the said pump 28 with a pipe 26 when either of said valves 21 and 25 are closed or opened, as necessity demands and as will be hereinafter more fully set forth.

As above stated, one or more cylinders 1 may be used for the treatment of the wood. In the present case I have illustrated a twin arrangement of cylinders; but it will be understood that I do not limit my invention to 45 this arrangement of cylinders I and connecting parts, although I will describe such arrangement in the present specification.

Upon the pipe 26 I have secured a T-fitting 29, from which extends to the right a pipe 30, 50 having a valve 31 and a pipe 32, which passes upwardly to a point near the central axis of one of said cylinders or tanks 1. At this point said pipe 32 has a fitting 33, from which a pipe 34 extends into said cylinder, and also 55 has another pipe 35, provided with a valve 36, extending therefrom. The said pipe 35 connects with a T-fitting 37, into which leads a main steam-supply pipe 38, which may be provided with a valve. In like manner I have 60 connected to the fitting 29 a pipe 40, having a valve 41, and an upwardly-extending pipe 42, which terminates at a point near the central axis of the other of said pair of cylinders or tanks 1. This pipe is provided at the top 65 with a fitting 43, from which a pipe, similar in arrangement to the pipe 34, connected with

tank. A pipe 44, in which there is a valve 45, also connects the fitting 43 with the T-fitting 37, and consequently with the main steam-70 pipe 38.

Each cylinder 1 has an opening 39 at a suitable point in the bottom, with which is connected a pipe 45, in which there is a valve 46. Each pipe 45 of each cylinder 1 is connected 75 by means of a fitting 47 in the respective pipes 32 and 42, as will be seen more especially from Figs. 1 and 2. Leading from a suitable point in the top of each cylinder or tank 1 is a pipe 48, provided with a valve 49, the pipe 48 be- 80 ing connected with a main pipe 50 in any suitable manner, which leads to a suitable exhauster or condenser of any well-known construction for causing a vacuum in the cylinders 1 for the purposes hereinafter more fully 8; set forth. Each cylinder 1 is also provided with a suitable pressure-gage 51 and a vacuum-indicator 52. Also connected with the fitting 37 is a steam-inlet pipe 53, having a T-fitting 54, and oppositely-extending branch 90 pipes 55 and 56, which are respectively connected at 57 with the respective cylinders or tanks 1. In the pipe 55 there is a valve 58, and in the pipe 56 there is a valve 59.

As will be seen from an inspection of Fig. 95 2, a heater-pipe 60 for steam or other heating medium connects with the cylinder or tank 7 and with a heating pipe or pipes 61, suitably arranged in said cylinder, as indicated in dotted outline.

I will now describe the construction of the tank or tanks 1 and the arrangement of the various parts and the pipes within said tank or tanks 1.

The tank or cylinder 1, as will be seen from 105 Fig. 6, is provided at its inner surface with longitudinally-extending cleats or angle-irons 62, on which I have placed shelves 63 for the placing thereon of the wood (in the shape of boards, blocks, slabs, or the like) to be treated. 110 Said shelves are preferably made of woven wire or other suitable material which will not obstruct the flow of any liquid therethrough which is to be passed into the cylinder or tank 1. At one end the cylinder or 115 tank 1 has a hinged or other suitable arrangement of door 64, which is provided in its circumferential edge with a suitable arrangement of receiving - slots 65. Encircling the outer peripheral edge of this end of the cylin- 120 der 1 and suitably secured thereto is a ring 66, provided with a packing or gasket 67 and swing-bolts 68, which can be arranged in said slots 65 and the door then hermetically sealed by drawing up tight certain nuts 69 on said 125 bolts 68, as will be clearly understood from an inspection of Fig. 10. In the opposite ends 70 of each cylinder 1 is a screw-fitting 71, into which the ends of the pipes 34 of the respective fittings 33 and 43 are screwed. 130 Said ends of each cylinder also have a similar fitting 71', with which the parts 57 of the steam-pipes 55 and 56 are connected. Sethe fitting 33, extends into said cylinder or | cured in said screw-fitting 71, on the inner

676,060

side of the cylinder 1, is a union or connection 72 and a fitting 73, which has connected therewith the radially-extending pipes 74. At the opposite end of said cylinder 1 is an-5 other fitting 75, and connected therewith are radially-arranged pipes 76. These two fittings 73 and 75 are also connected by means of a longitudinal pipe 77, extending centrally in the cylinder 1, said pipe being provided in 10 its cylindrical body with spray-holes or perforations 78, substantially as illustrated. The outer ends of said radially-extending pipes 74 and 76 are connected by the longitudinal pipes 79, having a suitable arrangement of 15 holes or perforations 80 for spraying the liquid in an inward direction toward the center of the cylinder 1. Suitable supporting devices, as 81x, may be arranged within the cylinder 1, substantially as shown, for rigidly secur-20 ing the various pipes 77 and 79 and the radially-extending pipes 74 and 76 in place. The said end 70, as has been stated, is also provided with the fitting 71', in which I have secured a pipe 81', which is connected with a header 25 81. Downwardly-extending pipes 82 are connected with the header, at the rear thereof, and each pipe 82 has a pipe 83, which extends longitudinally at or near the bottom of the cylinder, as will be clearly evident from an 30 inspection of Figs. 5, 6, and 7. At or near the rear of the cylinder or tank these pipes 83 are preferably all connected with a pipe or header 84, provided with an outlet 85, which is tapped in the fitting 86 in the bot-35 tom of the tank or cylinder 1, as clearly illustrated in Fig. 7, for drawing off any exhaust or condensed steam in said pipes 83, as will be clearly understood.

Having described the construction of the apparatus made according to my present invention, I will now briefly set forth its use and operation for rendering wood or other material tenacious or resistible to pressure from a die or dies without distorting or tearing the fiber or for rendering the wood fire-proof or impervious to moisture after having been impregnated with the mixture or fluid to which the wood or other material is treated.

After having placed kiln-dried wood or 50 other material, in the form of boards, slabs, blocks, or other suitable pieces, upon the shelves 63 in the cylinder or cylinders 1 the door 64 is closed and sealed, as above stated. The various valves 21, 25, 31, and 41 having 55 been closed, the valves 49 in the pipes 48 also having been closed, I open either or both sets of valves 36 and 58 and 45 and 59 and admit steam into the cylinder or cylinders 1 for the purpose of opening up the pores in the wood 60 and also removing any sap that may be contained in the wood. After a time the various valves 36, 58, 48, and 59 are again closed and valves 49 in the pipes 48 opened. Then by means of a pumping-condenser or other 65 suitable mechanism located in the pipe 50 all

or cylinders 1, and after a vacuum has been created (to be indicated by the gage 52) the valves 49 are again closed. In the tank or cylinder 7 is contained a suitable mixture of 70 water and glue, which is kept in a liquid state by the heat from the heating-pipe 61. I now open the valves 21 and 31 and 41 if both cylinders 1 are being used at the same time or only one of said valves 31 or 41 if but one cylinder 1 75 is being operated. The liquid from the cylinder or tank 7 is thus pumped through the various pipes into the spray-pipes of the cylinder or cylinders 1, from which the liquid is sprayed in all directions and over the several 80 surfaces of the wood or other material upon the shelves 63. The liquid which is in this manner sprayed into the cylinder or cylinders 1 is further kept for some time under pressure from the pump 28, with which the re- 85 spective pipes are connected, and is also heated by turning steam into the longitudinal pipes 83. After a time the vacuum in the cylinder or cylinders 1 is again broken by opening the valve or valves 49 and admitting 90 air from the main pipe 50. The valve 46 in the pipe 45 is now opened and any surplus liquid in the cylinder or cylinders 1 passes back, through the arrangement of piping illustrated in Fig. 1, into the cylinder or 95 tank 7. This having been accomplished, I now close valves 46, 21, and 31 and also all the valves in the steam-pipes. A vacuum is once more created in the manner stated above, and when produced valve or valves 49 are 100 closed. I then open valve 25 and valves 31 and 41 if both cylinders 1 are used, or only one valve 31 or 41, according to which cylinder 1 is in operation; but valve 21 is kept closed. In the cylinder or tank 8 I have a 105 liquid mixture of mica in acid or any other suitable mixture adapted for hardening or fireproofing purposes. This liquid mixture is then forced by means of the pump 28 through the respective pipes into the cylinder or cyl- 110 inders 1 and into the spray-pipes, from which it is sprayed into the cylinder and over and around the wood or material upon the shelves 63 and will penetrate and thoroughly impregnate the wood or other material. At the same 115 time this liquid mixture from the cylinder or tank 8 is preferably kept under pressure from the pump 28; but no steam is added. After the wood has been treated in this manner for the proper length of time the vacuum-valves 120 49 are opened, and valves 46 are also opened to permit any surplus liquid in the cylinder or cylinders 1 to again flow back into the cylinder or tank 8. The various valves may then all be closed and the door to each cylin- 125 der 1 opened for the removal of the wood or other material which had been placed therein for treatment.

and valves 49 in the pipes 48 opened. Then by means of a pumping-condenser or other suitable mechanism located in the pipe 50 all steam and air is drawn off from the cylinder.

676,060 4

bearing a design, and an ornamentation can I be produced in the wood in perfect imitation of hand-carving.

The apparatus may also be used for fire-5 proofing wood in a manner similar to that above set forth or for impregnating wood or other material with filler compounds of the various kinds.

The use of sprayer-pipes in the cylinder or co cylinders 1 is of the greatest advantage in that the liquid mixtures are distributed over the entire surface of the wood in fine spray, and thereby readily penetrate the pores of the wood to a greater depth than if the liquid 15 mixtures were passed into the cylinder in large volume. The liquid would in that case merely stop up the pores in the wood at or near the surface and would run off and collect in the bottom of the cylinder without 20 producing the desired results.

Having thus described my invention, what I claim is-

1. In an apparatus for impregnating wood, or other material, a cylinder having an inlet 25 and an outlet, a central spray-pipe connected with said inlet, spray-pipes at or near the inner surface of said cylinder or tank, and connecting-pipes between the several spray-pipes, substantially as and for the purposes set forth.

2. In an apparatus for impregnating wood, or other material, a cylinder having an inlet and an outlet, a central spray-pipe connected with said inlet, spray-pipes at or near the inner surface of said cylinder or tank, and con-35 necting - pipes between the several spraypipes, and an arrangement of shelves in said cylinder or tank, constructed to permit the flow or passage of a sprayed liquid through said shelves, substantially as and for the 40 purposes set forth.

3. In an apparatus for impregnating wood, or other material, a cylinder having an inlet and an outlet, a central spray-pipe connected with said inlet, spray-pipes at or near the in-45 ner surface of said cylinder or tank, and connecting-pipes between the several spraypipes, combined with a pair of cylinders or tanks 7 and 8, and a means of communication between the various tanks, substantially 50 as and for the purposes set forth.

4. In an apparatus for impregnating wood, or other material, a cylinder having an inlet and an outlet, a central spray-pipe connected with said inlet, spray-pipes at or near the in-55 ner surface of said cylinder or tank, and connecting - pipes between the several spraypipes, and an arrangement of shelves in said cylinder or tank, constructed to permit the flow or passage of a sprayed liquid through 60 said shelves, combined with a pair of cylinders or tanks 7 and 8, and a means of communication between the various tanks, substantially as and for the purposes set forth.

5. In an apparatus for impregnating wood, 65 or other material, a tank or cylinder containing the liquid for impregnation, a pump, a pipe connection between said pump and tank | said spray-pipes, and a heating means con-

or cylinder in which the wood or material to be treated is arranged, a pipe connection between said tank or cylinder and the pump, 70 and a valve or valves in said last-mentioned pipe connection, and a spraying means in said impregnating tank or cylinder, consisting of a central spray-pipe, spray-pipes at or near the inner surface of said impregnating 75 cylinder or tank, and connecting-pipes between the several spray-pipes, substantially

as and for the purposes set forth.

6. In an apparatus for impregnating wood, or other material, a tank or cylinder contain- 80 ing the liquid for impregnation, a pump, a pipe connection between said pump and tank or cylinder, and a valve in said pipe, an impregnating tank or cylinder in which the wood or material to be treated is arranged, a 85 pipe connection between said tank or cylinder and the pump, and a valve or valves in said last-mentioned pipe connection, and a steam pipe or pipes connected with and leading into said impregnating tank or cylinder, 90 and a spraying means in said impregnating tank or cylinder, consisting, essentially, of a central spray-pipe, spray-pipes at or near the inner surface of said impregnating tank or cylinder, and radially-arranged connecting- 95 pipes between the several spray-pipes, substantially as and for the purposes set forth.

7. In an apparatus for impregnating wood, or other material, a tank or cylinder containing liquid for impregnation, a pump, a pipe 100 connection between said pump and tank or cylinder, and a valve in said pipe, an impregnating tank or cylinder in which the wood or material to be treated is arranged, a pipe connection between said tank or cylinder and the 105 pump, and a valve or valves in said last-mentioned pipe connection, and a steam pipe or pipes connected with and leading into said impregnating tank or cylinder, and means connected with said impregnating-cylinder 110 for creating a vacuum therein, and a spraying means in said impregnating tank or cylinder, consisting, essentially, of a central spray-pipe, spray-pipes at or near the inner surface of said impregnating tank or cylin- 115 der, and radially-arranged connecting-pipes between the several spray-pipes, substantially as and for the purposes set forth.

8. In an apparatus for impregnating wood, or other material, a cylinder or tank 1, hav- 120 ing an inlet and an outlet, an arrangement of spray-pipes connected with said inlet, consisting, essentially, of a central spray-pipe 77, spray-pipes 79, and connecting-pipes between said spray-pipes, and a heating means con- 125 nected with said cylinder or tank 1, substantially as and for the purposes set forth.

9. In an apparatus for impregnating wood, or other material, a cylinder or tank 1, having an inlet and an outlet, an arrangement of 130 spray-pipes connected with said inlet, consisting, essentially, of a central spray-pipe 77, spray-pipes 79, and connecting-pipes between

676,060 5

nected with said cylinder or tank 1, consisting of a steam-pipe leading into said cylinder or tank, a head connected with said pipe, pipes 82 connected with said header, and longitudinally-arranged pipes 83 connected with said pipes 82, all substantially as and for the purposes set forth.

10. In an apparatus for impregnating wood, the combination, with a cylinder or tank containing the liquid with which the wood is to be treated, of an impregnating cylinder or tank in which the wood to be impregnated is placed, a spraying means in said impregnating cylinder or tank, consisting, essentially,

of a central spray-pipe, spray-pipes at or near

the inner surface of said impregnating cylinder or tank, and radially-arranged connecting-pipes between the several spray-pipes, and means for conveying the liquid from said first-mentioned cylinder or tank into said 20 impregnating cylinder or tank, substantially as and for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this

26th day of March, 1900.

SIGMUND WILLNER.

Witnesses:

Jos. H. DICKINSON, FREDK, C. FRAENTZEL.