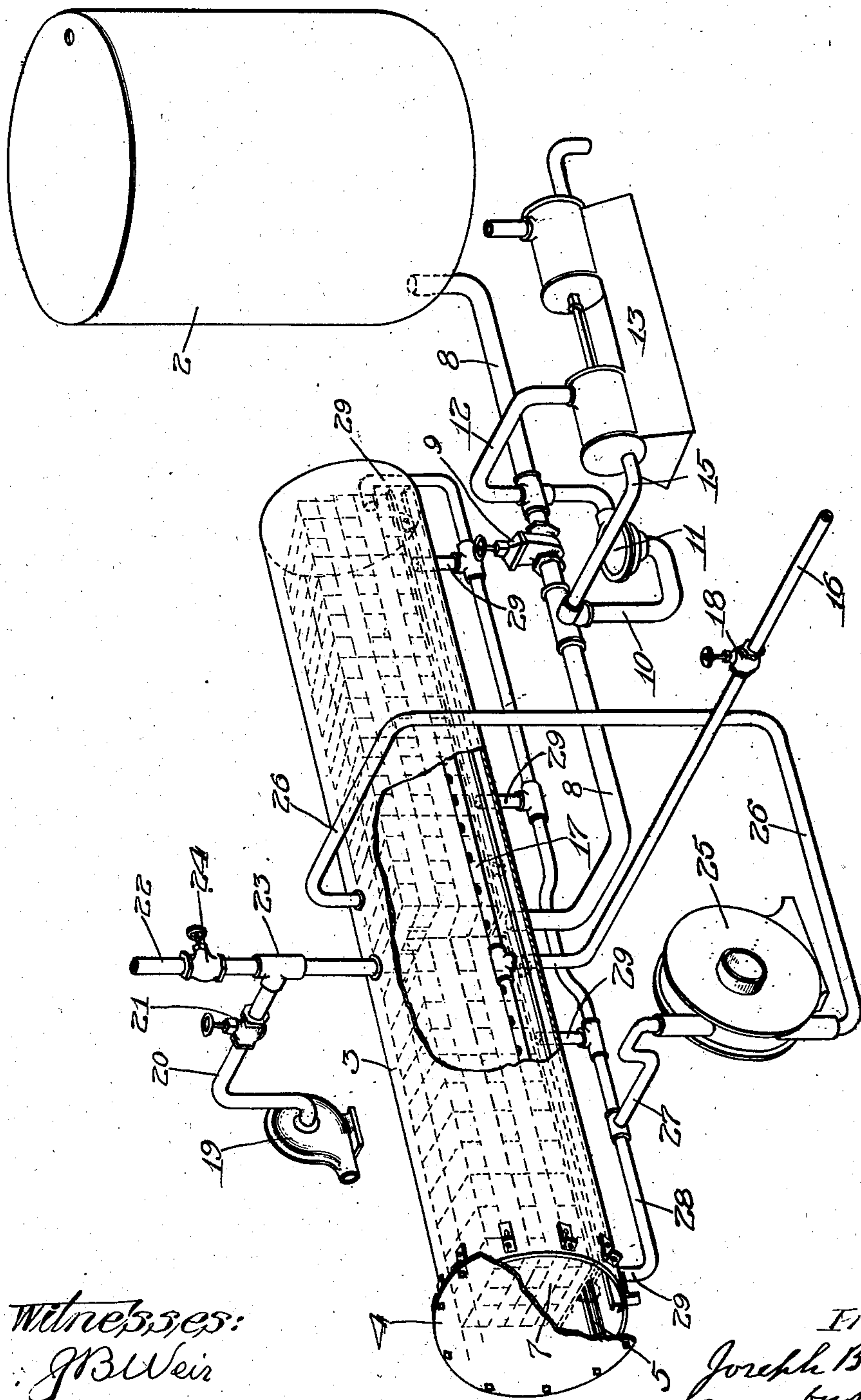


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J. B. CARD.
METHOD OF PRESERVING WOOD.
APPLICATION FILED FEB. 6, 1905.



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UNITED STATES PATENT OFFICE.

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METHOD OF PRESERVING WOOD.

No. 815,404.

Specification of Letters Patent.

Patented March 20, 1906.

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To all whom it may concern:

Be it known that I, JOSEPH B. CARD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Method of Preserving Wood, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to a new and improved method of preserving wood, especially railroad-ties, and especially to a new and improved process of preserving wood in which a mixture of preservative fluids of different specific gravities is employed.

As is well known, in order to prevent the decay of railroad-ties and other wooden articles which are exposed to the weather it has been customary to treat them to a preservative process consisting of the application to and absorption by the wood of preservative and antiseptic liquids. One method very commonly used for such treatment consists in placing the ties in a tank or suitable receptacle adapted to be closed water and air tight and after the ties have been placed in the receptacle filling the receptacle, so as to completely submerge the ties with the preservative fluid and allowing them to remain submerged in the fluid for a suitable length of time to cause the preservative fluid to thoroughly enter the pores and saturate the wood. It has also been customary to apply pressure to the tank full of preservative liquid, so that it may be contained in the tank under considerable pressure to assist the preservative process. Various forms of apparatus have also been designed to carry out this process. It has also been customary as preliminary to the application of the preservative fluid to first steam the ties in the preserving-chamber and after steaming to subject them to more or less of a vacuum in order to assist the thorough impregnation of the wood with the preservative fluid or fluids. Other methods have also been devised, such as forcibly spraying the ties in a containing-tank with the preservative fluid. A preservative fluid commonly used in such process is a suitable solution of chlorid of zinc. A difficulty arising from the use of chlorid of zinc or a similar preservative or antiseptic fluid arises from the fact that when such fluid is used alone it will leach out of the tie or be washed out gradually by the action of the weather. To overcome this, creosote or some liquid-tar preparation has been used in connection with the

chlorid-of-zinc solution for the purpose of stopping the pores of the wood and preventing the leaching out of the chlorid of zinc. The creosote itself in such a case also acts as a preservative and antiseptic fluid. My experience has shown that except for the difficulties which arise from the use of such a mixture and hereinafter pointed out a mixture of the chlorid-of-zinc solution and creosote secures the best results. When, however, a mixture of a solution of chlorid of zinc and some similar preservative or creosote or some similar substance is used, a great difficulty arises from the different specific gravities of the two liquids and from their not mixing properly. The ordinary creosote-oil purchasable on the market in this country is usually of much less specific gravity than the chlorid-of-zinc solution which is ordinarily used, containing such proportion of chlorid of zinc as is best for the preservative processes. It therefore follows that no matter how thoroughly the preservative fluids may be mixed before entering the tank under the application of pressure and during the length of time that it is necessary that the ties should be submerged in order to secure their thorough impregnation the heavier liquid—that is to say, the zinc solution—settles to the bottom and the lighter—that is to say, the creosote—rises to the top. It is obvious that this causes the ties at the top of the tank to receive too great a proportion of creosote and too small a proportion of the chlorid-of-zinc solution for the purposes for which said liquids are used, while with the ties at the bottom of the tank the reverse is the case. It results that the ties are not evenly impregnated and even that some may receive a wholly insufficient quantity of creosote to properly effect the preserving process. This difficulty has been recognized and various means suggested for overcoming it, none of which, however, are thoroughly successful in practice, and manufacturers have been obliged to import from Germany and at great expense specially-prepared creosote of the same specific gravity as the chlorid-of-zinc solution.

My improved process is especially directed to overcoming the difficulties above set forth, and I overcome the difficulties above suggested by agitating the mixed liquids while they are contained in the tank and maintained at a constant pressure so thoroughly as to prevent the separation of the liquids or

the settling of the one which is of the greater specific gravity toward the bottom of the tank and the consequent uneven and inadequate treatment of the ties.

Broadly speaking, then, my new process consists in placing the ties or other similar wooden articles to be treated in an inclosed vessel capable of being tightly sealed, in filling the vessel thus closed with a mixture of preservative fluids, preferably chlorid-of-zinc solution and creosote, so as to completely submerge the ties, placing and maintaining a constant pressure upon the liquids for a suitable length of time to impregnate the ties, and in agitating the liquids in the closed tank while the constant pressure is maintained in the tank during the time of the subjection of the wood to the treatment.

I have also devised a new and improved apparatus for the carrying out of the above process and illustrated in the accompanying drawing.

In the drawing the figure is an isometric view of my new and improved apparatus, broken away in certain places to show the interior structures.

Referring to the drawing, 2 indicates a tank adapted to contain preservative fluid.

3 indicates a cylinder or chamber which is closed at one end and provided with a door 4 at the other end which is adapted to be closed upon the cylinder, so as to make it air and water tight under pressure and which is secured in place to the end of the cylinder 3 in any well-known and approved manner. The cylinder 3, as shown, is preferably of a size adapted to take in several car-loads of ties and is provided at its bottom with tracks 5, upon which cars loaded with ties 7 are run in the cylinder, so as to nearly fill the same from end to end and to near the top.

8 indicates a pipe which leads out of the tank 2 and opens up into the cylinder 3, preferably at the bottom thereof, as shown. The pipe 8 is provided at a suitable place with a gate-valve 9.

10 indicates a by-pass pipe which opens up into the main pipe 8 upon each side of the valve 9 and is provided with a pressure-valve 11, which may be of any well-known form and construction and which is adapted when the pressure in the cylinder 3, produced as hereinafter described, exceeds a predetermined amount to open and relieve the pressure.

12 indicates a by-pass pipe which opens out of the pipe 8, between the valve 9 and the tank 2, into a pump 13. The pump 13 may be of any well-known form and mode of operation.

15 indicates a pipe which leads from the pump 13 and opens into the pipe 8 beyond the valve 9.

16 indicates a pipe which leads from any suitable source of steam-supply (not shown)

and leads into the cylinder 3, where it opens into a perforated pipe 17, which extends along the bottom of the cylinder 3.

18 indicates a valve suitably placed in the pipe 16.

19 indicates a fan which may be driven in either direction, and hence used, as herein-after described, either to produce a partial vacuum in the cylinder 3 or to force air into the cylinder 3. The fan 19 may be of any suitable construction and mode of operation and is power-driven from any suitable source of supply. (Not shown.)

20 indicates a pipe which leads from the fan 19 into the top of the cylinder 3 and is provided with a valve 21, adapted to open and close the pipe 20.

22 indicates an exhaust-pipe which leads from a suitable elbow 23 in the pipe 20 and opens into the atmosphere.

24 indicates a valve in the pipe 22 above its junction with the pipe 20.

25 indicates a rotary pump, which may be of any well-known and approved form and construction.

26 indicates a pipe which leads from the pump 25 and opens into the top of the cylinder 3.

27 indicates a pipe which leads from the discharge side of the pump 25 and opens into a pipe 28, which leads, by means of a number of branches 29, into the cylinder 3. I prefer to dispose of these branch pipes in substantially the manner shown in the drawing; but their position and points of opening into the tank may of course be varied as may be desired.

The complete operation of my process and of the mechanism above described is as follows: The tank 2 is supplied with a suitable mixture of preservative fluids. I prefer to use a mixture of a four-per-cent. chlorid-of-zinc solution and creosote in the proportions of eighty-eight per cent of the four-per-cent. chlorid-of-zinc solution and twelve per cent. of creosote. These proportions, however, may be varied as the nature of the work to be performed may dictate. The valve 9 is closed. The door 4 being removed, the cylinder 3 is loaded with the ties or other similar articles to which the preservative process is to be applied. As was said above, the most economical and preferable way is to load the ties upon suitable cars and run them into the cylinder, the cylinder being of suitable size, as was said above, for such purpose. The door 4 is then placed in position and securely locked in place so as to render the cylinder 3 air-tight and water-tight under pressure. The valves 18 and 24 are then opened, the valve 21 closed, and steam is allowed to flow through the pipe 16 and the perforated pipe 17 into the cylinder 3, the air being driven out through the pipe 22. When the cylinder 3 is filled with steam, the valve 24 is closed

and steam continued to be supplied through the pipe 16 until the ties are thoroughly steamed. The length of time to which the ties should be subjected to the steaming process will of course vary with the character of the wood and the work to be done. When the ties have been steamed a suitable length of time, the valve 18 is closed, the valve 21 opened, and the fan 19 driven so as to operate as an exhaust-fan, whereby the steam will be drawn from the cylinder 3 and a partial vacuum produced in the cylinder. The portion of the process so far described will extract the sap and other obstruction from the pores of the ties and open them to the action of the preservative fluid. The valve 21 is then closed, the valve 9 opened, and the cylinder 3 is filled from the tank 2 with the preservative mixture. When the cylinder 3 is filled, the valve 9 is closed and the pump 13 set in operation until a suitable pressure, preferably approximately one hundred pounds to the square inch, is set up in the cylinder 3 and in the liquid therein contained, the pressure being maintained thereafter by a slower but suitable operation of the pump 13. In case at any time the pressure exceeds the desired amount the pressure-valve 11, which is regulated accordingly, opens, and a passage being opened to the flow of the liquid in the pipe 8 upon both sides of the valve 9 the pressure will drop until the pressure-valve 11 closes again. The rotary pump 25 is then set in motion. By the operation of the pump the liquid is drawn from the cylinder 3 through the pipe 26 and forced through the pipes 27 and 28 and branch pipes 29 back again into the tank 2. It is obvious that as the apparatus shown is constructed there is a closed circuit for the liquid through the pipe 26, pump 25, and pipes 27, 28, and 29 back into the tank again and that therefore the constant pressure maintained in the tank by the pump 13, as above described, is maintained. By the withdrawal of the liquid from the tank and its discharge into the tank again through the operation of the pump 25 still under pressure the preservative-fluid mixture contained in the cylinder 3 will be agitated sufficiently to keep the liquids thoroughly mixed and to prevent the settling of the heavier during the entire length of time to which the ties are subjected to the treatment. The time required for their thorough impregnation will of course vary, both with the kind of wood in the ties and to a certain extent with the character and nature of the preservative fluids used. With the mixtures of chlorid-of-zinc solution and creosote above described and which I prefer to use, the average length of time for which the ties should be subjected to the process in order to thoroughly impregnate them will be approximately three hours. When the ties are sufficiently impregnated, the pumps 13 and 25

are stopped, the valve 9 opened, the valve 21 opened, and the fan set going in the opposite direction to force air into the cylinder 3. The valves 24 and 18 being of course closed, the forcing of the air into the cylinder 3 will drive the liquid out of the cylinder 3 into the tank 2 ready to be used again. When the cylinder is emptied, the fan 19 is stopped, the valve 20 opened, the valve 9 closed, the door 4 removed, and the ties thus impregnated removed from the cylinder.

I have shown and described the above apparatus as a new and improved apparatus adapted to the practicing of my new and improved method, and that is the form of apparatus which I prefer to use. It is obvious, however, that other forms of apparatus might be used for the practicing of my new method. I have also shown and described a rotary pump 25 as the mechanism in my new and improved apparatus by which the agitation of the liquids under pressure in the tank is brought about during the process of the treatment. This is the means which I prefer to use, the pump of course being constructed of a sufficient capacity to circulate and agitate the preserving fluids in the cylinder sufficiently to keep them constantly mixed during the treatment of the ties and to prevent the one of greater specific gravity settling at the bottom of the cylinder, the pressure upon the liquids being, as has been described, constantly maintained by the pump 13. It is obvious, however, that other means might be devised for producing this agitation of the preservative mixture. I have also shown the agitating apparatus so constructed and placed as to draw the liquid from the top of the tank and force it into the bottom. This is the form in which I prefer to construct it; but it is obvious that the liquid might be drawn from and forced into the tank from other points, and I do not limit my invention with reference to pipes so placed. It is obvious also that a suitable pressure might be brought into the tank and maintained therein by other means than by the pump 13. This, however, is the mechanism which I prefer to use.

I have described my new process as peculiarly adapted to the treatment of wooden articles—such as railway-ties, for instance. It is obvious, however, that my process may be used for the preservative treatment of other things, and I do not limit myself in its use to the treatment of wood.

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

1. The method of preserving wood and similar material by the use of a mixture of different preservative fluids, which consists in submerging the wood in a mixture of said preservative fluids in a closed receptacle, subjecting said preservative fluids to and maintaining them under pressure until the wood

is impregnated, and in circulating the said mixture in the tank while said mixture is maintained under pressure and during said impregnating process to cause the thorough and constant mixture of said fluids during said treatment.

2. The method of preserving wood and similar material by the use of a mixture of preservative fluids of different specific gravity, which consists in submerging the wood in a mixture of said fluids in a closed receptacle, subjecting said preservative fluids to and maintaining them under pressure until the wood is impregnated, and in circulating the said mixture in the tank while said mixture is maintained under pressure and during said impregnating process to cause the thorough and constant mixture of said fluids during said treatment.

3. The preservative method, which consists in submerging the material to be treated in a mixture of chlorid-of-zinc solution and creosote in a closed receptacle, subjecting said mixture to and maintaining it under pressure in said receptacle until the material

to be treated is impregnated, and agitating the said mixture in said receptacle while under pressure to keep the said fluids thoroughly mixed and prevent the settling of the heavier during the treatment.

4. The method of preserving wood and similar material by use of a mixture of preservative fluids of different specific gravity, which consists in placing the wood in a receptacle, closing said receptacle and filling the same with the fluid mixture, applying and maintaining pressure to said fluid mixture in said closed receptacle and simultaneously circulating the fluid contents while said fluid contents are maintained under fluid-pressure and during the impregnating process, and then forcing the preservative fluid by air-pressure back out of said closed receptacle and back into a reservoir, substantially as described.

JOSEPH B. CARD.

Witnesses:

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