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APPARATUS FOR MAKING ARTIFICIAL LUMBER.

(Application filed Dec. 23, 1898.)

(No Model.)

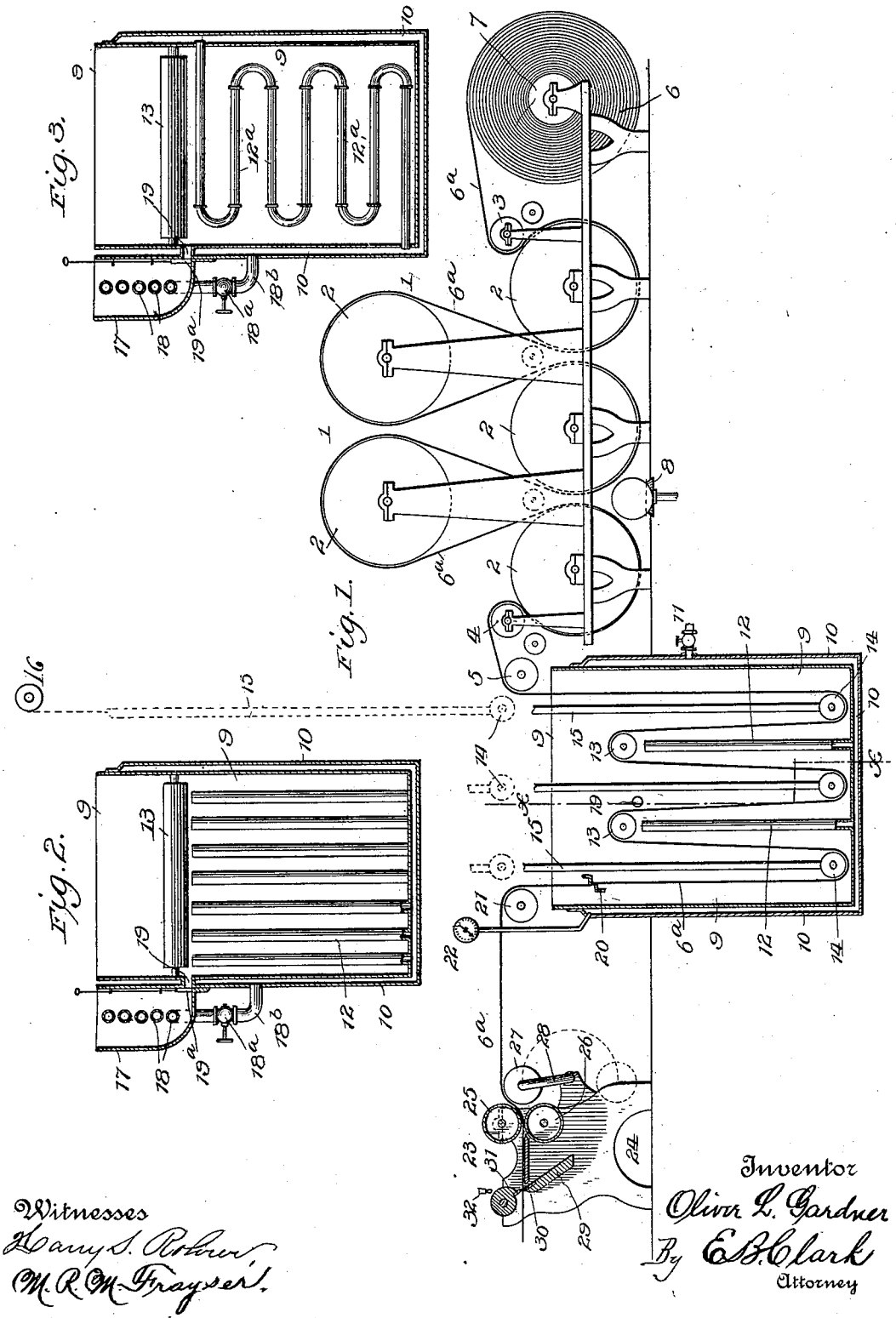


Fig. 1.

Fig. 2.

Fig. 3.

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APPARATUS FOR MAKING ARTIFICIAL LUMBER.

SPECIFICATION forming part of Letters Patent No. 631,743, dated August 22, 1899.

Application filed December 23, 1898. Serial No. 700,147. (No model.)

To all whom it may concern:

Be it known that I, OLIVER L. GARDNER, a citizen of the United States, residing at New York, (Brooklyn,) in the county of Kings and State of New York, have invented certain new and useful Improvements in Apparatus for Making Artificial Lumber; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to apparatus for manufacturing boards and panels of artificial lumber for architectural and decorative purposes.

The object of my invention is to provide for thoroughly and uniformly saturating or impregnating the whole cellular structure of strawboard, paper-board, or other fibrous board with a waterproofing solution and filling which shall impart great density, toughness, and hardness to such board preparatory to the manufacture of artificial lumber.

Another object is to provide for melting the rosin and preliminarily heating the oil and other ingredients and mixing them with the melted rosin for maintaining a continuous supply of heated saturating or impregnating solution to the saturating-compartment of the tank, so that the required high temperature in said compartment will be constantly maintained while the strawboard or other fibrous board is being passed through it for saturation.

Another object of my invention is to provide for maintaining a very high temperature—about 350° Fahrenheit—in the saturating solution adjacent to the entire surface of the strawboard as it is passed in a zigzag course through the saturating-tank.

These advantageous results are secured by means of my improved construction of a saturation-tank, as will be hereinafter specifically described.

Figure 1 represents a view, partly in elevation and partly in vertical section, of drying-cylinders, a saturating-tank, and cutting-machine. Fig. 2 represents a transverse vertical section on line x x through the saturation-tank, oil-receptacle, and rosin-melter. Fig. 3 represents a sectional view of a modification.

My improved apparatus is designed for treating what is known as "No. 50 strawboard," paper-board, or other fibrous board about one-sixteenth ($\frac{1}{16}$) of an inch thick. Before subjecting such board, in the ordinarily dry condition to the saturating or impregnating operation it is preliminarily heated to a temperature of about 150° to 200° Fahrenheit by passage over and in contact with steam-heated cylinders for expanding and opening the pores and expelling all occluded moisture.

In the drier 1 the steam-heated cylinders 2 are suitably mounted in journal-boxes in the frame in the usual manner and in practice are provided with steam-pipe connections, (not here shown,) which pass through their journal-boxes in a well-known manner. Guide-rollers 3, 4, and 5 are also suitably mounted in the frame for guiding the strip of strawboard in contact with the heating-cylinders. A roll 6 of ordinarily dry strawboard or paper-board as it comes from the mill is placed on the core 7 on a mandrel, and the sheet or strip 6^a is passed therefrom over guide-roll 3, and thence successively over and around the five steam-heated drying-cylinders 2, and thence out over the guide-rollers 4 and 5 and into the saturation-tank 9. Bevel-gears 8 and other gearing (not here shown) are used in practice to turn cylinders 2.

The satuaration-tank 9 is constructed with a tight steam-jacket 10 around its four sides and bottom and extends below the floor-line, as shown, for providing sufficient depth of saturating solution. The tank is made with a saturating-compartment 9 and the melting and mixing compartment 17. For the purpose of keeping the saturating solution at a very high temperature adjacent to the folds of strawboard undergoing treatment I provide the saturating-compartment 9 with one or more sets of transversely-arranged steam heating pipes or coils 12. I may use transverse rows of vertical steam-pipes 12, (shown in Figs. 1 and 2,) the separate pipes being closed at the top and screwed at their lower ends into the bottom plate of the tank, opening freely in the steam-jacket space below, as shown. A steam-supply pipe 11, having a valve, connects with the steam-jacket space. Instead of the vertical pipes (shown in Fig. 1)

I may use one or more flat coils or serpentines of steam-pipe 12^a, extending transversely across the tank, as shown in Fig. 3. These transversely-arranged steam-pipes, it will be observed, are placed directly beneath the transverse guide-rollers 13. The transverse guide-rollers 13 are suitably journaled in the side walls of the tank, so as to freely turn, but are stationary as regards change of location. In addition to the stationary rolls 13 I provide the vertically-movable guide-rolls 14, which are journaled upon the lower ends of the frames or rods 15. If two stationary guide-rollers 13 are used in the tank, then I provide three vertically-movable guide-rollers 14 and rods 15, as shown in Fig. 1, so that the strawboard may be passed in folds down and up in three compartments, adjajacent both to the steam-heated walls of the tank and to the transverse steam-pipes, so that the whole surface or area of the strip of board shall be subjected to a high heat as it is passed through the saturating solution. The frames or rods 15 are connected at their upper ends by ropes or chains, which pass over elevated pulleys 16, so that they may be raised to the elevated positions indicated by dotted lines, Fig. 1.

The rosin-melting and oil-mixing compartment 17 is constructed at one side or end of the tank and is provided with a coil or serpentine of steam heating-pipe 18, which connects at its inlet end with the pipe 18^b, leading into the steam space of jacket 10 and having a valve 18^a. A bottom opening 19 connects compartment 17 with the compartment 9 of the saturation-tank. A gate-valve 19^a may be fitted in a suitable guideway for closing the opening 19 and controlling the flow of melted rosin and oil and other substances forming the saturating solution into the saturating-compartment 9.

The compartment 17, in which the rosin is melted, the oil heated, and these ingredients and any others required are thoroughly mixed together, is an important feature of my saturation-tank for the reason that it is necessary to provide a continuous supply of the preheated saturating solution to the saturating-compartment, so as to maintain a constantly high temperature therein while the strawboard is being passed through for saturation. I have learned by experience that if cold oil is added directly to the saturating-campartment 9 it produces unsatisfactory results, causing dark spots to subsequently appear in the finished board and mar and disfigure it. If such boards were nailed to the ceilings or side walls and the dark spots afterward appeared, they would have to be removed and replaced by perfectly-saturated boards.

At the delivery side and near the upper end of compartment 9 is placed a transverse scraper 20, composed of two angle irons or bars, one a little above the other and so that the board 6^a can pass between them for removing the surplus of saturating liquid adhering to its surface. A steam-pressure gage 22 connects by a pipe with the steam jacket-space. Steam is preferably maintained within jacket 10 and transverse steam-pipes 12 at a pressure of about one hundred and fifty pounds, so as to maintain the saturating liquid in the tank at a temperature of about 350° Fahrenheit. A guide-roller 21, suitably journaled at the outlet side of the tank, supports the strip of board 6^a as it passes to the cutting-machine.

The cutting-machine 23 is constructed with a frame 24, having suitable journal-boxes, in which are supported by their journals a pair of pressure-rolls 25 and 26, which in practice are operated by suitable gearing (not here shown) for drawing forward the strip of board 6^a. A swinging guide-roller 27, supported by a pivoted or journaled arm 28, is provided for guiding and supporting the board on its passage to the pressure-rolls. This roller 27 can be swung downward into the position indicated by dotted lines. The strip of board 6^a passes from rolls 25 and 26 over a supporting-plate to the cutting knives or blades. The lower stationary blade 30 is secured to a heavy transverse bar 29, and the revolving blade 31 is secured to an eccentric revoluble mandrel, so that its cutting edge may just pass by the cutting edge of blade 30 and serve to cut the strip of board into sheets of the desired length. In the path of the revolving knife is secured a transverse wiper 32, having folds of felt arranged and operating in a well-known manner, for removing gummy matter from the revolving blade 31. In practice I usually cut the strip of board 6^a into sheets twelve feet long to form my standard board; but other lengths are readily cut for special purposes by properly adjusting the operating-gearing of the revolving knife.

In operating my apparatus ordinarily dry strawboard or paper-board or other suitable fibrous board about one-sixteenth ($\frac{1}{16}$) of an inch thick, or thicker, if desired, as found in the market in rolls, such as 6, is placed on the core 7 on a mandrel, and is thence passed over the guide-rollers over and in contact with the heating-cylinders 2, where it is heated to a high temperature, between 150° and 200° Fahrenheit. This operation opens the pores and drives off water-vapor, so that the board will perfectly receive the saturating solution. This saturating solution is preferably composed of ingredients in about the following proportion: To about one hundred pounds of rosin is added a mixture of paraffin-oil, one gallon, and linseed-oil, one-sixteenth ($\frac{1}{16}$) of a gallon. Steam at about one hundred and fifty pounds pressure is admitted to jacket 10 and the sets of transverse pipes 12 or 12^a, and the composition of melted rosin and oil in about the proportion above stated is filled into the saturating-compartment 9 until it rises within about six inches of the top of the steam heating-tubes 12. The rosin is preferably first melted in the com-

partment 17 and the oils are added thereto and heated and intimately mixed with the rosin before the composition is admitted into the compartment 9. At the proper time the valve 18[a] in steam-pipe 18[b] is opened and steam passed from the jacket 10 into the coil 18 for melting and heating the rosin and oil. The saturating solution having been filled into the compartment 9 to the desired height and the temperature raised to about 350° Fahrenheit, and the vertically-movable guide-rollers 14 being in the elevated position above tank 9, as indicated by dotted lines, the dry hot strip of board is drawn across the top of the tank, and then the rollers 14 are depressed, carrying down the board over the stationary rollers 13, so that it assumes a zigzag course up and down from the inlet to the outlet side of the tank, as clearly shown in Fig. 1. The strip of board is passed out through the scraper 20 over the guide-roller 21 and between the compression-rollers 25 and 26 of the cutter, by means of which it is drawn forward through the saturating-compartment in exact proportion to the feed forward through the drier and heater.

I have found in practice that it is important to heat the solution composed of rosin, paraffin-oil, and linseed-oil and the surface of the passing board in compartment 9 to about 350° Fahrenheit in order to cause the solution to thoroughly penetrate the board, filling all the pores and interstices and thoroughly cementing the fibers. This high heat is necessary for producing these very desirable results. The transverse sets of steam heating-pipes 12 and 12[a] are important for maintaining the high temperature of the solution close to the whole surface of the passing board, as illustrated in Fig. 1.

The product of this process is denser, harder, tougher, and less liable to warp or shrink or shell apart than any product of strawboard heretofore produced. Unless this operation is thoroughly performed, as above described, the product is apt to absorb moisture and to split or shell apart. As the saturated board 6[a] is drawn forward by the pressure-rollers 25 26 it is cut into the desired lengths by the revolving blade 31. The saturated board herein described is subsequently used for making finished boards or panels of artificial lumber by properly cementing the saturated sheets, subjecting them to high pressure, painting, or frescoing, embossing, &c., to produce finished panels for use in decorative and architectural purposes.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A saturation-tank, having a saturating-compartment, constructed with a steam-jacket, provided with a steam-supply pipe, one or more transversely-arranged sets of steam heating-pipes, a transverse guide-roller directly above said transverse set of pipes and other guide-rollers near the bottom of the compartment, for guiding a strip of board up and down adjacent to said set of transverse steam-pipes, substantially as described.

2. A saturation-tank having a saturating-compartment constructed with a surrounding steam-jacket, one or more sets of transversely-arranged steam-pipes connecting with the steam-space of said jacket, a transverse guide-roller above said transverse set of pipes and vertically-movable guide-rollers adapted to be depressed to the bottom of the compartment for guiding a strip of board through the saturating solution adjacent to the highly-heated surfaces of the tank and transverse steam-pipes, substantially as described.

3. A saturation-tank, having a saturating-compartment, constructed with a steam-jacket at the sides and bottom, provided with a steam-supply pipe, one or more sets of transversely-arranged vertical tubes opening into the steam-space at the bottom, in combination with transverse guide-rollers above said steam-pipes and one or more vertically-movable rolls, adapted to be depressed to the bottom of the tank, and to be raised above the same for convenience in immersing the strip of board and guiding it through the saturating solution, substantially as described.

4. The saturating-compartment of the tank constructed with a steam-jacket and one or more sets of transverse steam heating-pipes, in combination with transverse guide-rollers above said pipes, vertically-movable guide-rollers adapted to be depressed to the bottom of the tank, a transverse scraper at the delivery side of the tank for removing the surplus solution from the saturated board, and guide-rollers above the tank at the entering and delivery sides thereof, substantially as described.

5. A saturating-tank, constructed with a saturating-compartment, having a steam-jacket, and one or more sets of transverse steam heating-pipes and with a compartment 17, having a heating-coil 18, connecting by a valved pipe with the steam-jacket and a bottom opening 19, leading into the saturating-compartment, said compartment 17 serving for melting rosin, preliminarily heating oil and other ingredients, and mixing them with the melted rosin for furnishing a continuous supply of heated saturated solution to the saturating-compartment.

In testimony whereof I affix my signature in presence of two witnesses.

OLIVER L. GARDNER.

Witnesses:
VICTOR J. EVANS,
HUGH M. STERLING.