(No Model.) 3 Sheets—Sheet 1.

T. HYATT.

ILLUMINATING VAULT COVER OR GRATING TILE, &c.

No. 286,012. Patented Oct. 2, 1883.

Fig. 1.

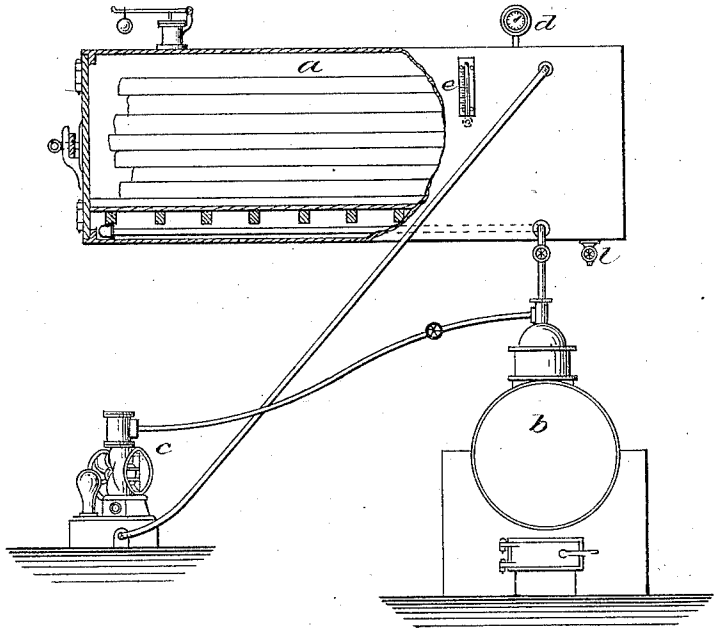


Fig. 4.

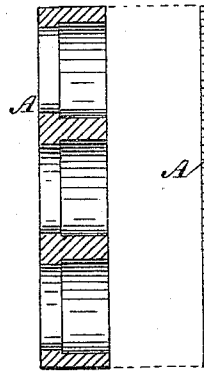


Fig. 2.

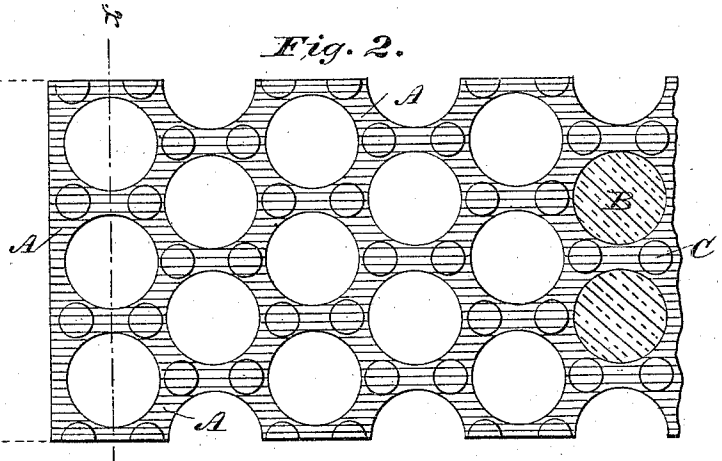
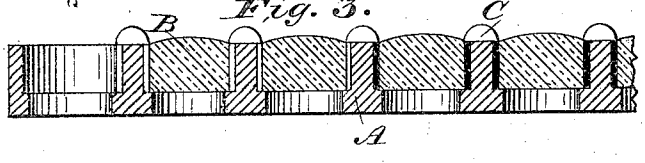


Fig. 3.



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Guy. De Mott.

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(No Model.) 3 Sheets—Sheet 2.

T. HYATT.

ILLUMINATING VAULT COVER OR GRATING TILE, &c.

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Fig. 11.

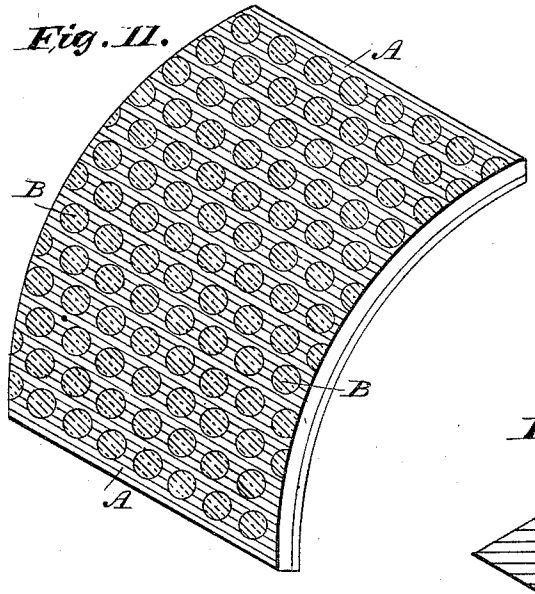


Fig. 5

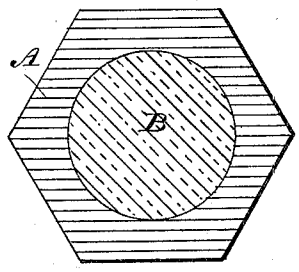


Fig. 6.

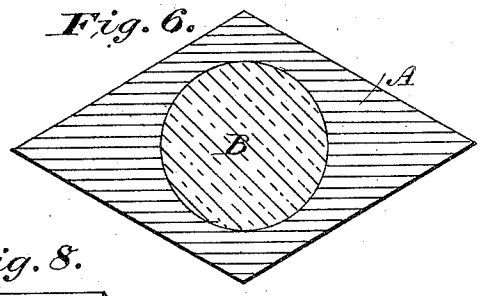


Fig. 10.

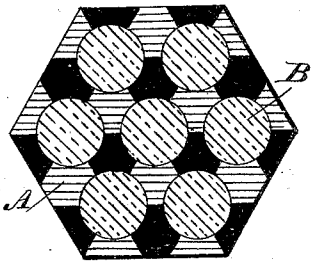


Fig. 8.

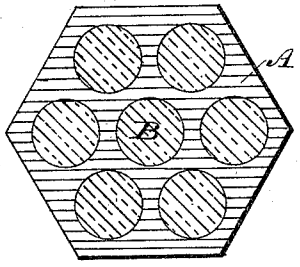


Fig. 7.

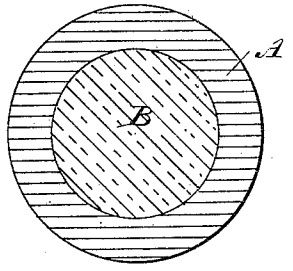
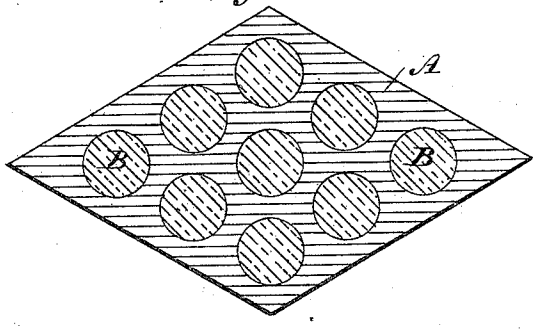


Fig. 9.



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(No Model.) 3 Sheets—Sheet 3.

T. HYATT.

ILLUMINATING VAULT COVER OR GRATING TILE, &c.

No. 286,012. Patented Oct. 2, 1883.

Fig. 12.

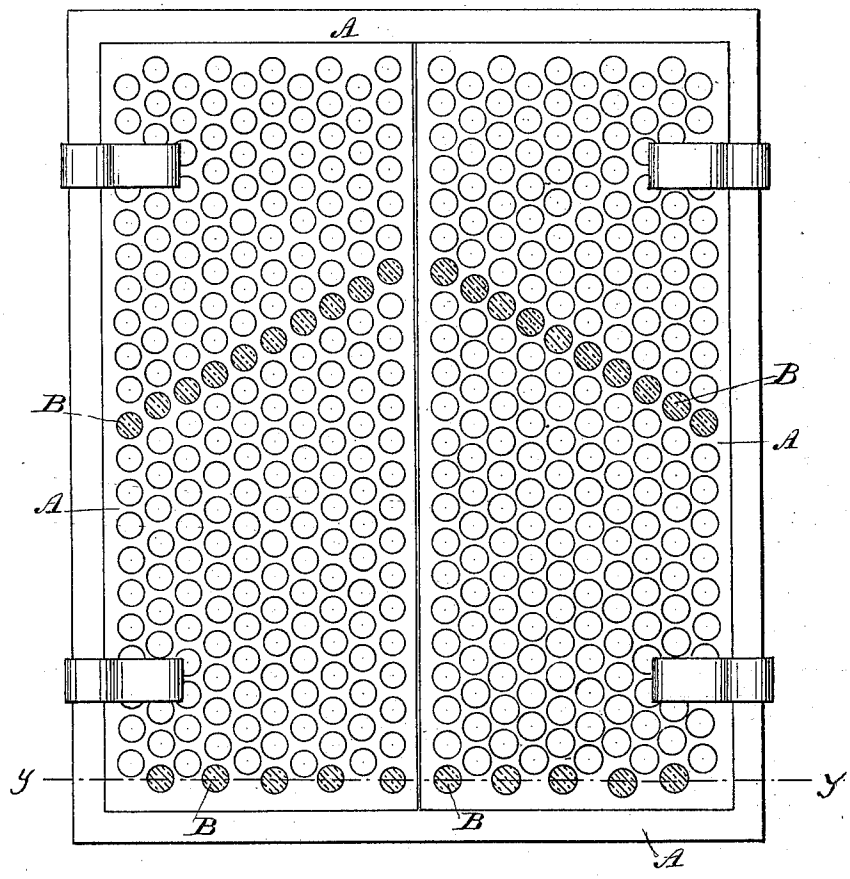

Fig. 13.

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UNITED STATES PATENT OFFICE.

THADDEUS HYATT, OF NEW YORK, N. Y.

ILLUMINATING VAULT-COVER OR GRATING-TILE, &c.

SPECIFICATION forming part of Letters Patent No. 286,012, dated October 2, 1883.

Application filed September 3, 1883. (No model.)

To all whom it may concern:

Be it known that I, THADDEUS HYATT, a citizen of the United States, residing at the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Illuminating Vault-Covers or Grating-Tiles and Surfaces Made of them, of which the following is a description, reference being had therein to the accompanying drawings, making part of this specification.

The grating-tiles set with glass that compose the illuminating-surfaces in universal use in the patent-light industry of the country are made of cast-iron, and where the construction is an elevator-door the weight of the doors and their liability to break is a serious objection to their use, while in constructing illuminating top roofs and principal-story rear-extension roofs the great weight of the cast-iron is also objectionable. The illuminating-roofs made by me of sheet metal to avoid the weight of cast-iron produced condensed moisture in winter on the under side of the roof, that required a lining of non-conducting material on the under side or a layer of such material on the weather side.

The object of my present invention is to substitute wood for metal, as being lighter, cheaper, safe for being walked over, and better as a non-conducting material when set with glass for roof-making and coal-hole plates or vault-covers and area-coverings, whether as simple platforms or in the form of steps made of risers and treads; but wood in its natural state, however well seasoned, will not answer the purpose.

My invention therefore consists in the employment of wood that has been previously treated by heat or chemicals and made proof against shrinkage in dry weather or exposure to heat, and against swelling in wet weather or when exposed to moisture or dampness of any kind. The wood selected by me, of preference, as the material out of which to make wood grating-tiles for combination with glass is one of several kinds manufactured and in the market. The kind selected by me is termed "vulcanized wood," and is prepared by a process patented to Louis S. Robbins by Patent No. 165,758, dated July 20, 1875; but I propose to make use of natural wood of any kind that may be suitable to be converted into wood gratings when the wood has been rendered proof against decay and change by the agency of heat or chemicals or preserving materials of any kind; and I hereby enumerate such as at present are considered to be the reliable ones, as set forth in a volume entitled "A Treatise on Dry Rot in Timber, by Thomas Allen Britton, London, 1875." The different methods proposed for seasoning timber, as given at page 168 of Britton's work, are as follows, viz: "Vacuum and pressure processes generally"—Bréant's, Bethell's, Payne's, Perin's, Tissier's; "Vacuum by condensation of steam"—Tissier's, Bréant, Payne, Renard Perin, 1848; Brochard and Watteau, 1847; "Separate condenser"—Tissier; "Employ sulphate of copper in closed vessels"—Bethell's patent, July 11, 1838; Tissier, October 22, 1844; Molin's paper, 1853; Payne's pamphlet; Légé and Fleury's pamphlet; "Current of steam"—Moll's patent, January 19, 1835; Tissier's patent, October 22, 1844; Payne's patent, November 14, 1846; Meyer d'Uslan, January 2, 1851; Payne's pamphlet; "Hot solution"—Tissier's patent, October 22, 1844; Knab's patent, September 8, 1846." (to which I will add Shaw's American Patent 28,309, dated May 15, 1860.) The ingredients for preserving timber enumerated in Britton's work are as follows, viz: "Acid sulphuric, vitriolic, and of tar; carbonate of potash, soda, barytes; sulphate of copper, iron, zinc, lime, magnesia, barytes, alumina, soda; salt, neutral; salt selenites; oil, vegetable, animal, mineral; muriate of soda, marcosites, mundic; marcosites, barytes; nitrate of potash; animal glue; animal wax; quicklime; resins of different kinds; sublimate, corrosive; peat, moss. The most successful patentees have been Bethell and Burnett in England and Boncherie in France. The most successful patents may be placed in three classes, and we give the key-note of their success: First, one material and one application: creosote, petroleum; second, two materials and one application: chloride of zinc and water, sulphate of copper and water, corrosive sublimate and water; third, two materials and two applications: sulphate of iron and water, afterward sulphate of lime and water. We

thus observe there are twice three successful patent processes. Any inventions which cannot be brought under these three classes have had short life—at least we think so."

I have quoted the above from Mr. Britton's volume (which also commends charred wood) in order to show the many different processes and materials offered to me from which to select a perfectly-prepared wood capable of replacing iron as a grating-tile for combination with glasses to be employed as coal-hole plates and as tiles for constructing illuminating-roofs and roof-pavements; but I do not select one of these to the exclusion of all others, and say this with glass is my invention. On the contrary, I select the one I consider to be the most perfect—viz., "vulcanized wood"—combine glasses with it, and regard all the others as equivalents, my invention being a grating-tile or vault-cover made of natural wood rendered incapable of change by artificial means, and set with glasses to give light.

The invention of vulcanizing wood, quoting the language of the patent to Mr. Robbins, hereinbefore mentioned, "consists in a process for curing wood, wherein the wood is heated to about 212° Fahrenheit to expel the atmosphere from the pores, and then the temperature is increased simultaneously with an increase of atmospheric or gaseous pressure within the closed vessel containing the wood. By the surrounding increased atmospheric pressure the vaporization of the sap is prevented, and the vaporizable products are coagulated and diffused with nearly uniformity throughout the mass and retained, so that the pores of the wood are freed from air and filled to a considerable extent, and the vegetable juices and liquid matter that would promote fermentation are so changed by the heat that the risk of fermentation and decay is avoided to a great extent.

"In carrying out my process of preparing wood any suitable apparatus may be employed; but I have shown in the drawing means that can be used."

(Figure 1 is a copy of the drawing shown in Mr. Robbins's patent.)

"The chamber *a* is adapted to receive the wood, and it will be of a size suitable to the material operated upon. It will generally be provided with a track in the bottom, with a car into which the wood is piled, and said car is run into the chamber *a* and the end closed by a suitable head or doors. The boiler *b* is connected to coils of steam-pipes within the chamber *a*, so that the temperature of such chamber *a* may be raised to any desired degree of heat. Hot water may take the place of steam, or heated air may be introduced. The air-pump *c* is employed to force air into the chamber or receiver *a*, and a pressure-gage, *d*, and thermometer at *e* should be provided. The wood confined in the chamber or receiver *a* is heated, and when the temperature is such that the vapors begin to distill—say about 212° Fahrenheit—then the air-pump is set to work, and atmospheric air is forced into such chamber, and the pressure is increased in about the ratio of one pound for each degree of temperature, so that the pressure will be sufficient to prevent the evaporation of the juices, resinous and watery matters from the wood, and the resinous matters are melted and dispersed with considerable uniformity throughout the wood, so as to fill up the pores of the wood, and the atmosphere will largely be excluded, because the vapors in the wood will expand and fill the pores before the atmospheric pressure is increased, and hence there will be nothing to interfere with the melted resinous matters penetrating the mass with great uniformity by capillary attraction; and these resinous matters, that would distill in the form of hydrocarbon vapors at atmospheric pressure, are confined by the increased pressure, and solidify with the wood and render it very dense. The vegetable albumen is also solidified, and the result of the treatment is a very strong, uniform, and hard wood, free from sap and other matters that would hasten its destruction by fermentation. This heating operation tends to destroy insects and germs that might destroy the wood or injure the same. When the curing process has been continued a sufficient time, which will depend upon the sizes of the pieces under treatment and their quality, the pressure is not to be relieved suddenly, but the heat is to be shut off, the air-pump continued in action, and a cock at *l* opened, which will allow the heated air to escape, and the supply and delivery of the air are to be so regulated that by the time the temperature is reduced to about 200° Fahrenheit the pressure will be about the same inside the chamber as outside of it. By this process the sap and resinous materials are melted and changed, so as to become fixed at the same time that they are more thoroughly diffused throughout the wood, and the mass is rendered more uniform and homogeneous; hence, this operation may properly be termed 'vulcanizing the wood.'"

Figure 1 represents Robbins's apparatus for vulcanizing wood; Fig. 2, wood grating got out of preserved wood; Fig. 3, cross-section of Fig. 2 set with glasses; Fig. 4, cross-section of Fig. 3 on line *x x*. Figs. 5, 6, 7 represent preserved-wood mounts set each with a glass. Figs. 8, 9, and 10 represent preserved-wood mounts or quarries made for and each one containing a number of glasses, Fig. 10 being inlaid with different colored woods to produce a mosaic appearance. Fig. 11 represents a preserved wood grating-tile of bent or curved shape for making rear-extension curved illuminating-roofs. Fig. 12 represents a pair of elevator illuminating-grating doors made of preserved wood, some of the openings being set with glasses. Fig. 13 is a cross-section of Fig. 12 on the line *y y*.

A represents a preserved-wood grating; B, glasses; C, metal buttons to protect glasses.

I propose to employ the vulcanized or prepared wood in the form of boards or planks set with glass for making floors, area-coverings, and roofs. When for making curved roofs, the boards or planks are to be bent by any well-known process of bending wood previous to being cured. I propose to also make use of the preserved wood as mounts for glasses, as shown by Figs. 5, 6, 7, to be combined with an iron frame or a wood foundation; and I also propose to make use of the wood in the form of large mounts or quarries to hold a number of glasses, as shown by Figs. 8, 9, 10. The mounts I propose to make in any geometrical or ornamental form.

In employing the preserved wood for elevator-doors, as represented by Fig. 11, I may in some cases combine the glass-set wood planks with a wrought-iron frame. It will be readily seen that this new material for making patent-light constructions affords a wider scope of utility and ornamentation than can be had with metal, together with freedom from being affected by heat and cold and changes of temperature, as is the case with iron. As to the fire-proof quality of constructions made of preserved wood, I propose to meet this point by overlaying the wood with some fire-resisting material.

Having thus fully explained the nature and scope of my invention, what I claim, and desire to secure by Letters Patent, is—

1. Illuminating-gratings made of vulcanized wood and set with glasses, substantially as and for the purposes herein set forth and illustrated.

2. Illuminating floors, roofs, and roof-pavements made of vulcanized wood set with glasses, substantially as and for the purposes herein set forth and illustrated.

3. Illuminating-grating risers, treads and steps, and step-roofs made of vulcanized wood set with glasses, substantially as and for the purposes herein set forth and illustrated.

4. Illuminating mounts and quarries made of vulcanized wood set with glasses, substantially as and for the purposes herein set forth and illustrated.

5. Illuminating gratings, mounts, or quarries made of natural wood preserved against decay by charring, smoking, saturating with oil, with or without pressure, oxidation, chemical impregnation, creosoting, burnetizing, or otherwise being treated chemically, as herein set forth, or by processes analogous to the ones herein mentioned, and set with glass, for use as vault-covers, floors, roofs, and roof-pavements, substantially as and for the purposes herein set forth and illustrated.

6. Illuminating-grating elevator-doors made of vulcanized wood, or of preserved wood, and set with glasses, substantially as and for the purposes herein set forth and illustrated.

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

THADDEUS HYATT.

Witnesses:
T. C. BRECHT,
L. W. SINSABAUGH.