(No Model.)

G. S. MAYHEW.

ARTIFICIAL LUMBER AND COMPOSITION MATERIAL.

No. 517,822. Patented Apr. 3, 1894.

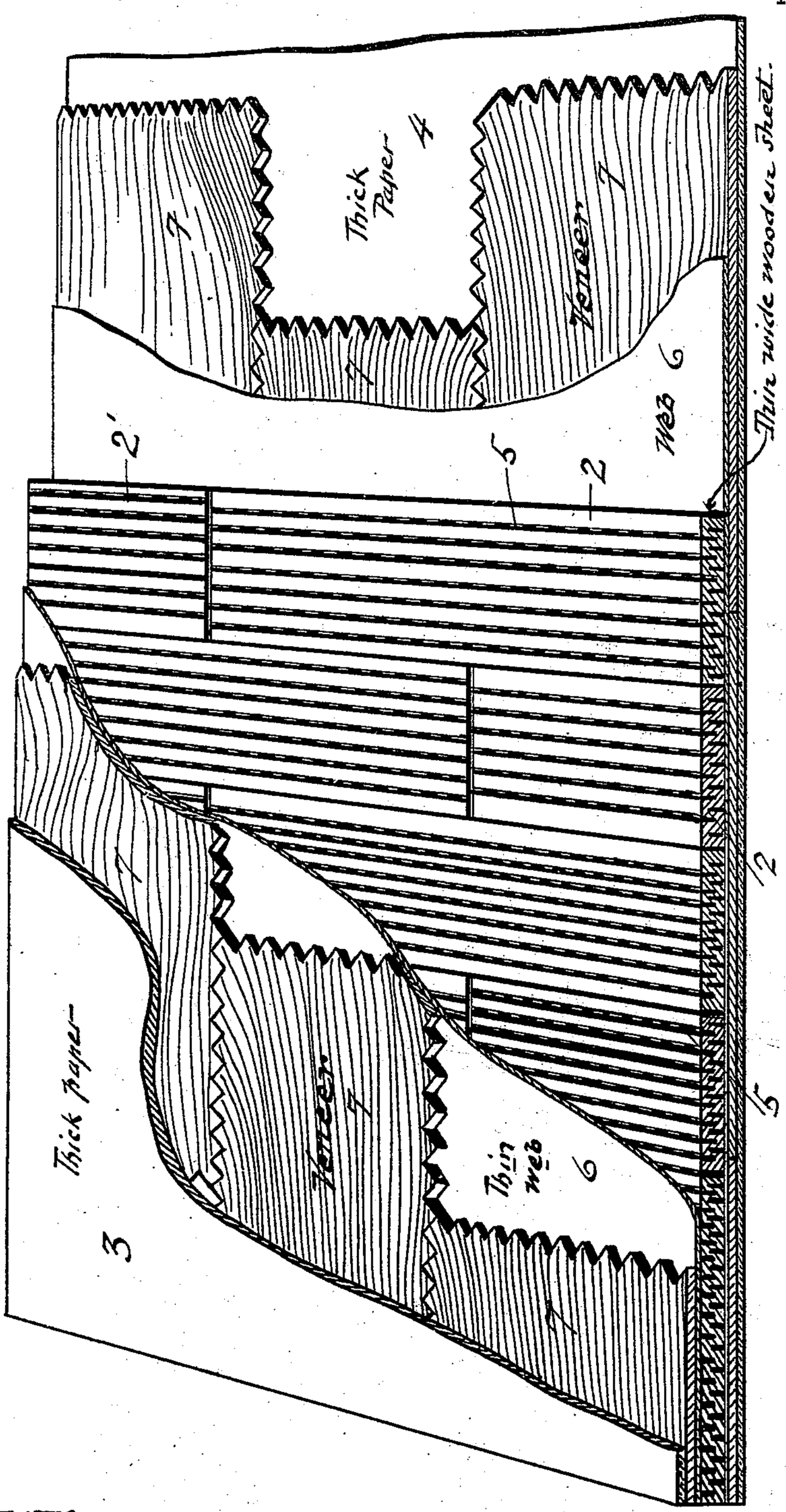

Fig. 1.

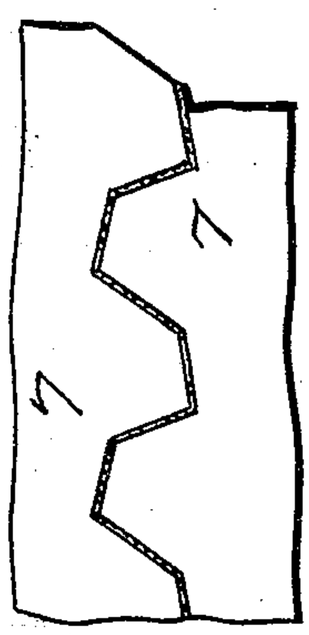

Fig. 3.

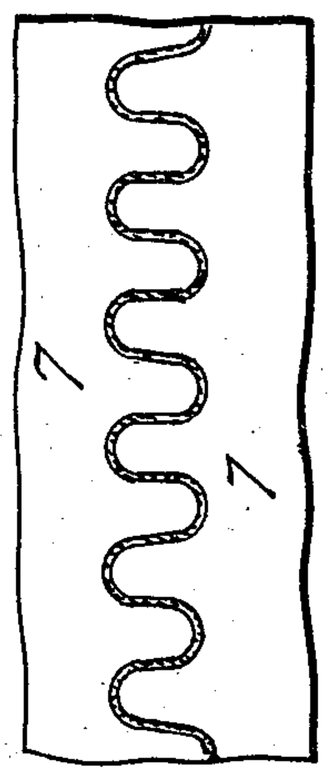

Fig. 4.

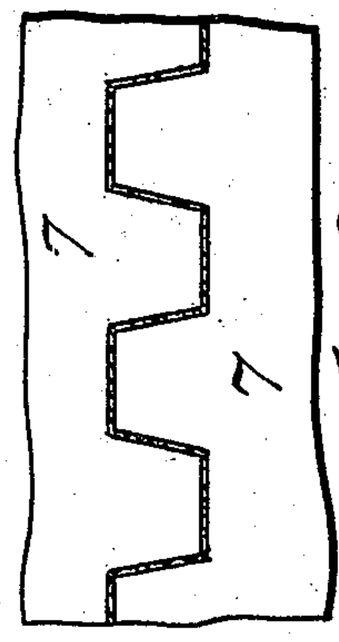

Fig. 2.

Witnesses.
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THE NATIONAL LITHOGRAPHING COMPANY,
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UNITED STATES PATENT OFFICE.

GEORGE S. MAYHEW, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO CHARLES AXIL SMITH, OF SAME PLACE.

ARTIFICIAL LUMBER OR COMPOSITION MATERIAL.

SPECIFICATION forming part of Letters Patent No. 517,822, dated April 3, 1894.

Application filed May 2, 1893. Serial No. 472,798. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. MAYHEW, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented a certain new and Improved Artificial Lumber or Composition Material, of which the following is a specification.

My invention relates to a material or lumber composed of layers of paper and wood each retaining its identity and secured together in such a manner as to form a smooth surfaced and even board of any desired thickness and of extraordinary strength, solidity and inflexibility and possessing at the same time qualities which render it durable in nearly all uses and climates.

The object of my invention is to provide a composition material made up in the form of large boards and which will be strong and durable, and not shrink, swell, or warp, and which will above all things possess a smooth even and unbroken surface adapting the same for use in the finest interior finish of houses as well as adapting it for employment in cabinet work, various lines of manufacture and many of the less, exacting arts.

To this end my invention consists in the combination, with a body or core made up of a series of wide but thin wooden boards or sheets laid edge to edge and the grain thereof having a common direction, of a series of thinner but preferably wider sheets or veneers of wood laid with their grain extending transversely to that of the core sheets, and two thick sheets of paper arranged upon opposite sides of the complete core thus formed, and the whole being firmly secured together by a suitable quick drying adhesive material to form a single homogeneous mass having the form of a thin, wide, and long board.

My invention consists further in carrying-webs for the adhesive material and permanently arranged between the inner and outer parts or courses of wood.

My invention consists further in particular construction for the several parts and in various combinations all as hereinafter described and particularly pointed out in the claims.

The invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a perspective view showing a piece of composition material embodying my invention. Figs. 2, 3, and 4, are enlarged views of several of the many forms of serrated edges which I employ for parts of my material.

As shown in the drawings, my composition material or composite board is made up of two sheets 3 and 4 of thick heavy straw or pulp board, between which are secured, by a suitable adhesive material, a number of wooden parts composing a strong and inflexible core, which is given smooth surfaces by the thick paper facings. The inner parts 2 of the core consist in a series of wide but thin sheets of wood, the grain of which has a common direction transverse to the length of the long sheets 3 and 4. These parts 2 may extend clear across the wide paper sheets or a portion thereof may be of less length and be pieced out by shorter and smaller parts 2′, as shown in Fig. 1. With this construction the long wooden sheets 2 have their ends lapped by one another so that the joints between the long and the short pieces do not form themselves into a continuous line throughout the length of the large boards. The inner sheets 2 are provided in opposite sides with a series of closely arranged rows of deep indentations 5, which extend nearly through the board but not clear through the same, leaving small solid parts between the several strips into which each wide sheet is so nearly separated. These indentations may partake of the form of deep grooves instead of a series of small indentations but I prefer the latter. Either form separates the wide sheet or sheets 2 into a large number of small parts running lengthwise with the grain and thereby preventing transverse shrinkage or warping, while the solid portions between the several longitudinal parts serve to lock the same to one another and prevent one part swelling or shrinking and moving with respect to the other. The surfaces of this inner core, having the transverse grain, are covered by thin webs 6 of paper or cloth and of just sufficient strength to carry the weight caused by a

thorough coating of both its sides with a quick setting adhesive material. By applying the adhesive material in this way the body therecf is kept too small to permeate the indentations 5 to prevent their performing the proper function. The cracks between the wide sheets 2 are preferably filled with the adhesive material to secure said parts together. Upon the outsides of the webs 6 I arrange a number of very thin wood veneers in comparatively smooth and very thin sheets 7, all arranged so that their grain crosses that of the parts 2. The adhesive material carried by the webs 6 serves to secure the veneers 7 in place. These veneers are preferably provided with serrated edges, the word "serrated" being here intended to mean any form of tongued and notched edge. The serrated edges of the several veneers fit into one another respectively and the tongues of one completely interlock with those of the adjoining veneer thereby preventing movement of either veneer with respect to the other, which movement might result in warping the composite board of which they form a part. The thick sheets 2 are secured upon the smooth surfaces made by the wide and thin veneers, the same kind of adhesive material which is employed upon the webs being preferably used between the inner sides of the long paper sheets 3 and 4 and the veneers.

In the drawings the thickness of the composite board formed of all the above described parts is considerably exaggerated, while the length and width of the parts thereof are shown very much smaller than in practice, as the parts 2 are often from twelve to fifteen inches in width and from two to six feet in length, and the veneers 7 are preferably at least twelve inches in width and of greater length than width. The serrated edge may have the form of a V-tongue and a notch; or an abrupt or square end with inclined sides as shown in Fig. 2.

In place of the form shown in Fig. 2 I may use that shown in Fig. 3 where all of the angles of the tongues and notches are inclined with respect to the original straight edge of the veneer or wide sheet. While in Fig. 4 curved tongues and notches are shown as equally desirable. The parts of the board, after being assembled, and connected by adhesive material, are subjected to a heavy pressure which disseminates the quick setting adhesive material and forces the same into the cracks extending through from sheet to sheet of the enveloping paper as before stated but not into the indentations. The serrated outlines of the thin veneers furnish such an extended area or passage for the adhesive material that the same is spread over a very large surface and prevented from forming ridges, which, when hardened might form ridges beneath the surface sheets 3 and 4 and mar the smooth appearance of the same. By the use of the peculiarly formed veneers, however, in the shape described this difficulty is overcome and a perfectly smooth surface obtained upon each side of the composite board.

The wooden parts before being used are preferably dried and particularly the veneers, which are usually heated to such a high degree as to destroy the life of the wood. After the composite board is pressed it is dried in a suitable kiln. It is obvious that the crossed grains of the parts of the wooden core and the equal strength thereof at all points absolutely prevent the warping or bulging of the composite board due to shrinking or warping of the parts thereof. The board thus formed after being dried is extremely strong and inflexible though capable of being easily worked by ordinary carpenter's tools and has such a quality of denseness as to be a very poor conductor of sound, except where specially designed and subjected to an extraordinarily heavy pressure. An inferior quality of material may be made with a core composed of thin wooden strips arranged in three courses, the grain of the outer courses extending in an opposite direction to that of the middle course, or one course of the thin strips (or one course of the wide veneers in the board described) may be omitted. The composite board so constructed however is far more apt to warp than the board first described and though the latter costs somewhat more I much prefer its use.

By the employment of fire or water proof material or both in the construction of my board, making either the adhesive material, or the paper board used, fire or water proof or both, the board so constituted may be adapted to resist the action of fire or water.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In an artificial lumber or composition material a wooden core composed of three thin layers of wood each made up of a series of thin sheets or strips and the grain of the outer layers having a common direction transverse to that of the middle layer, in combination with thick paper or pulp board facings for said core and an interposed adhesive material or cement between and securing all of said parts firmly together to form a thin but inflexible board, substantially as described.

2. The combination in a composition material of two thick sheets of heavy paper or pulp board with a core arranged between said sheets of paper and composed of a layer of wide but thin sheets of wood, and, two layers arranged upon opposite sides thereof and composed of thin, wide veneers arranged transversely with respect to said sheets of wood and an interposed adhesive material securing all of said parts firmly together, substantially as described.

3. The combination, in an artificial lumber or composition material, of a series of thin wide wooden sheets, with thin cement-carrying-webs arranged upon opposite sides of said

series or layer, and thin and wide veneers laid upon opposite sides thereof, with their grain running across that of the said wooden sheets, substantially as described, and for the purpose specified.

4. The combination, in an artificial lumber or composition material, of a series or layer of thin wide wooden sheets, with thin cement-carrying-webs arranged upon opposite sides of said series or layer, and thin and wide veneers laid upon opposite sides thereof with their grain running across that of the said wooden sheets, and thick paper or pulp board facings secured upon said veneers by a suitable adhesive material or cement, substantially as described.

5. The combination, in an artificial lumber or composition material, of a series of thin wide sheets of wood arranged edge to edge and provided in their opposite sides with a series of rows of indentations, with a series of thin wide wood veneers arranged upon opposite sides of said thin sheets and secured thereto by an adhesive material, said veneers being arranged with their grain crossing that of said sheets, substantially as described.

6. The combination, in an artificial lumber or composition material, of a series of thin sheets of wood arranged edge to edge and having their sides provided with a series of rows of indentations, thin wide wood veneers arranged upon opposite sides of said thin sheets of wood, thick sheets of paper or pulp board inclosing said veneers and an adhesive material interposed between said parts to secure the same firmly and inflexibly together, substantially as described.

7. The combination, in an artificial lumber or composition material, of the thin wide sheets of wood arranged edge to edge and having both sides provided with a series of rows of indentations extending with the grain of the wood, with a course of thin wood veneers laid cross-grained to said sheets of wood; with sheets of paper secured upon opposite sides of the wooden core so formed by a suitable adhesive material, substantially as described.

8. The combination, in an artificial lumber or composition material, of the thin wooden sheets arranged in a thin layer with the carrying webs for the adhesive material and whereby the same is applied, thin wood veneers having serrated and interlocking edges and secured by the adhesive material upon said webs, the grain of the wood veneers extending in an opposite direction to that of the wooden sheets, substantially as described.

9. The combination, in an artificial lumber or composition material of the thin wooden sheets arranged in a thin layer with two layers arranged upon opposite sides thereof and each composed of a series of thin wood veneers having serrated and interlocking edges, and the thick paper or pulp board facings secured upon said veneers and all parts being firmly secured together by a suitable adhesive material, substantially as described.

10. The combination, in an artificial lumber or composition material, of the thin wooden sheets, with the carrying webs for the adhesive material and whereby the same is applied, thin wood veneers having serrated and interlocking edges and secured by the adhesive material upon said webs, the grain of the wood veneers extending in an opposite direction to that of the wooden sheets, and thick facings of artificial material secured upon said veneers by adhesive material, substantially as described.

11. The combination, in an artificial material or composition material, of the thin wooden sheets arranged edge to edge with carrying webs for adhesive material applied to opposite sides of said wooden sheets, thin wooden veneers arranged across grain to and secured upon the same, thick paper sheets secured upon said veneers, said wooden sheets provided with the closely arranged indentations in opposite sides, said veneers having serrated interlocking edges, and the whole secured together by an adhesive material and subjected to a heavy pressure and dried, substantially as described.

In testimony whereof witness my hand this 22d day of April, A. D. 1893.

GEORGE S. MAYHEW.

In presence of—
C. G. HAWLEY,
A. R. ROGERS.