UNITED STATES PATENT OFFICE.

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ART OF COLORING WOOD.

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To all whom it may concern:

Be it known that I, WILLIAM A. HALL, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented or discovered certain new and useful Improvements in the Art of Coloring Wood, of which the following is a specification.

It is well known to those familiar with the structures of wood that the heart portions of the wood are much less porous, and therefore less absorbent, than the sap portions thereof, and of course it is very difficult to obtain lumber which is all sap or all heart. In the processes of treating comparatively inexpensive woods, for the purpose of securing products closely resembling the higher priced wood, such as walnut, mahogany, etc., and in which processes coloring dyes alone, or coloring chemicals mixed with coloring dyes are forced into and throughout the bodies of the woods, it has heretofore been found impossible to obtain uniform colors in the sap and heart portions of the woods. Where coloring solutions alone are employed the coloring matter becomes deposited principally in the sap portions of the woods, so that such portions will become quite dark, leaving the heart portions of the woods many shades lighter. When the woods are colored by a very penetrating chemical solution, such as an ammoniacal solution, it has been found that the heart portions of the woods (being very rich in tannic ligneous matter, or ligneous matter containing tannin, which is acted on by the ammonia) become darkened to a much greater extent than the sap portions of the woods.

The present invention has for its object to obviate the difficulties above referred to, so as to produce artificially colored woods in which the colors or shades will be substantially uniform throughout the heart and sap portions thereof.

In carrying the invention into effect, with a weak solution of ammonia (say 2 gals. of 26% ammonia in 50 gals. of water) is mixed a coloring matter or dye which must either be soluble in the ammoniacal solution or be unaffected by ammonia. In other words, the coloring matter or dye which is used must not be of an acid character so as to be precipitated from its solution by ammonia, nor one whose color would be destroyed by ammonia. The coloring matter or dye which is preferred for this purpose is a wood extract, such as can be obtained from the wood or bark of trees which are rich in tannin (such as hemlock, oak and chestnut), and a greater or less quantity of this wood extract is mixed with the ammoniacal solution to produce the shades or colors desired.

In the process of treating the wood, which is preferably in the form of boards, flitches or deals, the wood is first thoroughly dried, either by seasoning in the open air or by kiln drying, or by both. It is then preferably subjected, in a closed receptacle, to the action of a vacuum preferably above 25 inches of mercury, and which will be sufficiently powerful and long continued to remove from the wood practically all the air therein contained, so as to make it absorbent or receptive to the fluids to be later applied. The ammoniacal solution, with the coloring matter mixed therewith, is then introduced or drawn into the receptacle and a high hydraulic or air pressure (preferably from 300 to 800 pounds to the square inch) is applied and maintained until the wood is thoroughly impregnated throughout.

The coloring solution is preferably introduced into the closed receptacle in a heated condition, at approximately 200° F., or is heated to about this temperature after being introduced into the closed receptacle. Any of the low priced woods, such as beech, birch, maple, etc. may be treated by this process, and will be colored to a beautiful brown resembling black walnut by the ammoniacal solution with the wood extracts therein above mentioned. In forcing the solution into the wood, by the high pressure referred to, the artificial coloring matter is largely deposited in the sap portions of the wood, while the ammonia, having a much higher capillary speed of penetration, finds its way throughout the heart portions of the wood and colors the said heart portions a dark brown by chemical action on the wood, such coloring being uniform with the brown color imparted to the sap portions of the wood by the action of the ammonia with the addition of the artificial coloring matter. In other words, the sap portions of the wood will be largely colored by the brown stain of the artificial coloring matter, although somewhat colored by the chemical action of the ammonia; while the heart portions of the wood, which contain larger proportions of

tannic ligneous matter than the sap portions of the wood, will be wholly or principally colored by the chemical action of the hot ammonia; so that in the resulting product the heart and sap portions of the wood will be uniformly colored to the same, or practically the same, shades.

Having thus described my invention I claim and desire to secure by Letters Patent:—

1. The herein-described process of coloring wood, consisting in treating the same, under a high pressure, with an aqueous ammoniacal solution mixed with a suitable coloring dye.

2. The herein-described process of coloring wood, consisting in treating the same, under a high pressure, with a hot aqueous ammoniacal solution mixed with a suitable coloring dye.

3. The herein-described process of coloring wood, consisting in treating the same, under a high pressure, with an aqueous ammoniacal solution mixed with a suitable wood extract.

4. The herein-described process of coloring wood, consisting in treating the same, under a high pressure, with a hot aqueous ammoniacal solution mixed with a suitable wood extract.

5. The herein described process of coloring wood, consisting in exhausting the air from the wood by a vacuum process to render the wood absorbent, and then treating the same, under a high pressure, with an aqueous ammoniacal solution containing a suitable coloring matter which is soluble in the said solution and which is not injurable by ammonia.

6. The herein-described process of coloring wood, consisting in exhausting the air from the wood by a vacuum process to render the wood absorbent, and then treating the same, under a high pressure, with a hot aqueous ammoniacal solution containing a suitable coloring matter which is soluble in the said solution and which is not injurable by ammonia.

7. The herein-described process of coloring wood, consisting in exhausting the air from the wood by a vacuum process to render the wood absorbent, and then treating the same, under a high pressure, with an aqueous ammoniacal solution containing a suitable coloring matter which is soluble in the said solution and which is unaffected by ammonia, such coloring matter consisting of a wood extract, as hereinbefore described.

8. The herein-described process of coloring wood, consisting in exhausting the air from the wood by a vacuum process to render the wood absorbent, and then treating the same, under a high pressure, with a hot aqueous ammoniacal solution containing a suitable coloring matter which is soluble in the said solution and which is unaffected by ammonia, such coloring matter consisting of a wood extract, as hereinbefore described.

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

WILLIAM AUGUSTUS HALL.

Witnesses:
JOHN C. McCUSKER,
C. M. SWEENEY.