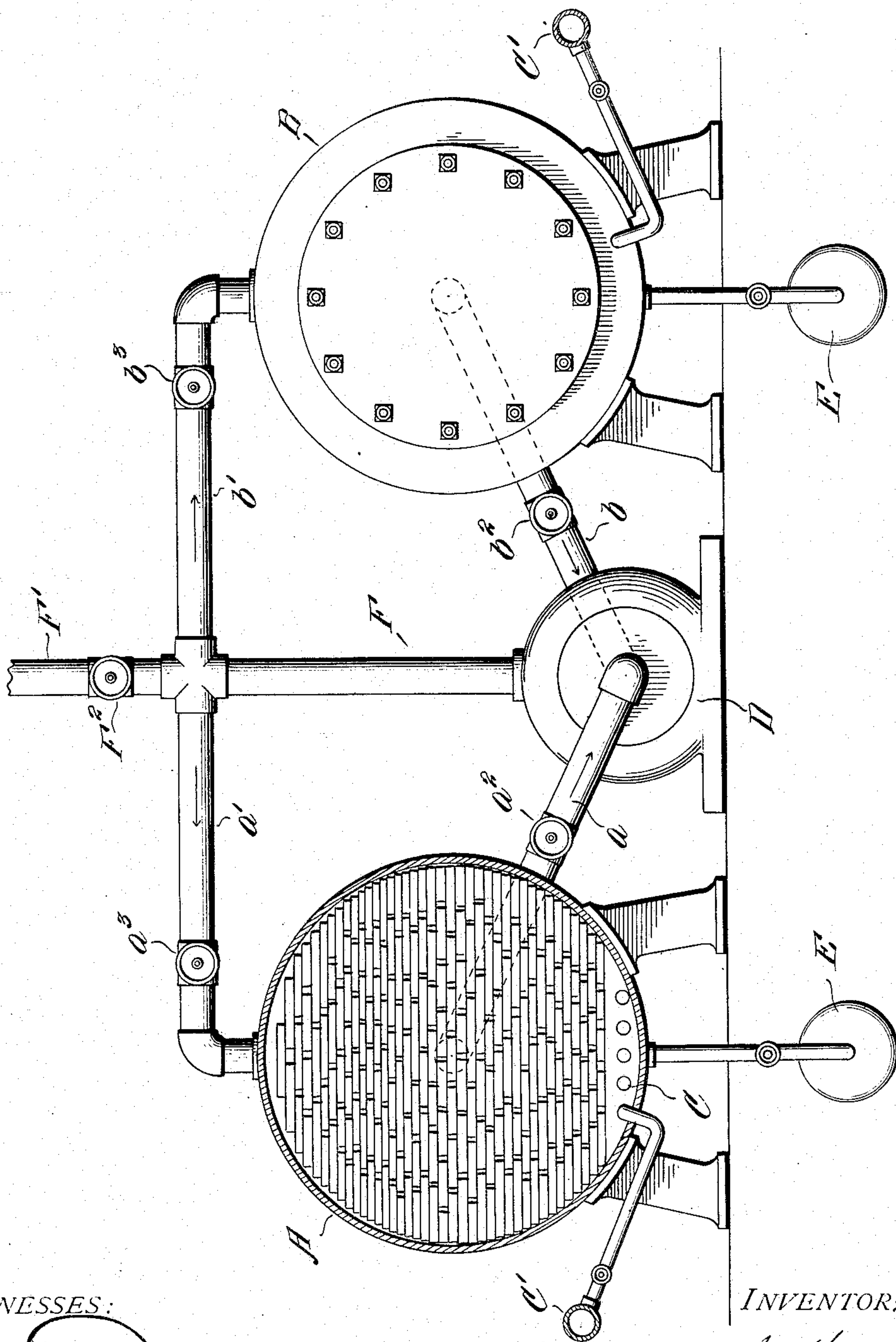


W. A. HALL.  
ART OF COLORING WOOD.  
APPLICATION FILED MAY 7, 1908.

939,015.

Patented Nov. 2, 1909.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## ART OF COLORING WOOD.

939,015.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed May 7, 1908. Serial No. 431,531.

*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, reference being had therein to the accompanying drawing.

This invention relates to the art of transforming or coloring wood so as to produce, from some of the cheaper or more common woods, products of very attractive appearance, and which will be very desirable for cabinet work and other uses.

The present improvement is more especially applicable to woods, such as oak, chestnut, etc., which contain considerable tannin which, when acted upon by ammonia gas, will cause the wood to be colored to a rich, dark brown, this gas being caused to thoroughly permeate the wood being treated so as to color the same throughout.

The accompanying drawing is a somewhat diagrammatic view of an apparatus by which the invention may be carried into effect.

Referring to the drawing A, B, denote cylinders, which may be of any suitable size and which will be provided with doors, capable of being tightly sealed, and which, when opened, will permit the lumber which is to be treated to be inserted or removed; such lumber being preferably in the form of flitches, planks, or boards. These cylinders are preferably provided at their bottoms with steam pipes or coils C to be connected with any suitable source of steam supply, as mains C', so that the cylinders may be heated by steam.

D denotes an air pump connected by pipes *a* and *b* with the cylinders A and B, respectively. Said pump is also connected by a pipe F with pipes *a'* and *b'* which also communicate with the cylinders A and B. The pipe F also communicates with a vent pipe F', provided with a suitable valve F<sup>2</sup>, and the pipes *a*, *b*, *a'* and *b'* are also preferably provided with suitable valves *a*<sup>2</sup>, *b*<sup>2</sup>, *a*<sup>3</sup> and *b*<sup>3</sup> respectively. The cylinders A and B will preferably be connected with a suitable tank or tanks, as E, preferably containing liquid ammonia gas under heavy pressure.

In practicing the invention the seasoned

or well-dried lumber to be treated is placed in the cylinders A and B, and that one of the said cylinders which is first to be used, say cylinder A, is then preferably moderately heated by admitting steam to the coils or pipes C to expand the air in the wood and thus make the withdrawal of the air from the wood by vacuum treatment more easy. The air pump is then operated to create a vacuum of 25 inches, or thereabouts, to withdraw the air from the wood, the air thus withdrawn being exhausted at the vent pipe F'. The tanks or cylinders E will preferably be heated, in any suitable manner, as by steam pipes or coils, or otherwise, before admitting the gas therefrom to the cylinders A and B. If this be not done ice is liable to form in the valves, resulting from intense cold produced by the passage of the gas into the vacuum, and the formation of an objectionable liquid on the wood may also result. Ammonia gas is then admitted to the cylinder from a tank E, and a pressure is applied to the cylinder, either through the pressure of the gas from the tank E or by pressure created by the air pump D. This pressure need not be very heavy at first, as a preliminary pressure of ten pounds or so to the square inch will be sufficient. The gas pressure in the cylinder containing the wood is then increased to from 50 to 200 pounds to the square inch, and this will preferably be accomplished by a further heating of the cylinder A to expand the gas therein. This pressure and the suction of the wood due to the previous vacuum treatment will cause the ammonia gas to permeate the wood throughout; filling the pores, and by acting on the tanning or tannic acid contained in the wood the latter will be colored throughout to a rich brown, resembling what is known as antique or cathedral oak. The pressure in the cylinder, to force the gas into and throughout the wood, will be continued for a period of from one to several hours, according to the thickness of the lumber. When the treatment of the lumber in cylinder A has been completed the ammonia gas in said cylinder may be admitted to cylinder B which will also preferably be heated and from which the air has been exhausted by the air pump, and pressure will then be applied to cylinder B in the same manner as above described as to cylinder A, to force the ammonia gas throughout the lumber



contained in said cylinder; and while the lumber in cylinder B is being treated cylinder A may be charged with new lumber, as may also be done with cylinder B when the lumber in cylinder A is being treated. Thus by employing two communicating cylinders the ammonia gas may be used over and over, with a resulting economy, both in course the two-cylinder mode of treatment is not positively necessary in carrying the novel process into effect.

In some instances, and for some purposes, it will be found desirable to remove, as nearly as possible, all the gas from the wood by vacuum or suction treatment, and the advantages of this will be two-fold; first, in order to utilize all of the gas, for the purposes of economy, and, second, to get the surplus ammonia gas out of the wood to render the latter fit for immediate use, as otherwise a strong and pungent odor of ammonia will exhale from the wood, and this would be objectionable. Also, in some cases, free ammonia gas in the wood may be deleterious to the finish to be applied to the wood.

Thus by the use of two communicating cylinders, as above described, the same gas may be used alternately in the cylinders, and what little waste of gas may occur can be supplied or compensated for by gas drawn from the tank or tanks E. Also the use of two cylinders permits one to be charged with fresh lumber while the lumber is being treated in the other, resulting in economy of time and labor, as well as of gas, as above stated. Also the use of two cylinders permits the gas which may be extracted from the treated wood in one cylinder by the vacuum pump to be pumped directly over into the other cylinder by the same vacuum and force pump; thus providing against loss of the gas thus extracted.

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

1. The herein described process for coloring lumber containing tannin, consisting in forcing heated ammoniacal gas into and throughout the wood by pressure, so that the action of the said gas on the tannin in the wood will color the same chemically throughout.

2. The herein described process for coloring lumber containing tannin, consisting in subjecting the wood to a vacuum process, in a closed receptacle, to exhaust the air therefrom, and then forcing an ammoniacal gas into and throughout the wood, by pressure, thus causing such gas to permeate the wood throughout, so that the action of the said gas on the tannin in the wood will color the same chemically.

3. The herein-described process for coloring wood containing tannin, consisting in heating the wood in a closed receptacle to

expand the air contained therein, then subjecting the wood to vacuum treatment to exhaust the air therefrom, and then forcing ammoniacal gas into the wood, by pressure, thus causing such gas to permeate the wood throughout to color the same chemically by acting on the tannin.

4. The herein described process for coloring wood containing tannin, consisting in subjecting the wood to vacuum treatment to exhaust the air therefrom, then forcing ammoniacal gas into the wood, thereby causing such gas to permeate the wood throughout to color the same chemically by acting on the tannin, and then exhausting the ammoniacal gas from the wood by a second vacuum treatment.

5. The herein described process for coloring wood containing tannin, consisting in heating the wood in a closed receptacle to expand the air contained therein, then subjecting the wood to vacuum treatment to exhaust the air therefrom, then forcing ammoniacal gas into the wood by pressure, thus causing such gas to permeate the wood throughout to color the same chemically by acting on the tannin, and then exhausting the ammoniacal gas from the wood by a second vacuum treatment.

6. The herein described process for coloring lumber containing tannin, consisting in forcing previously heated ammoniacal gas into and throughout the wood, by pressure, so that the action of the said gas on the tannin in the wood will color the same chemically, such forcing of the gas into and throughout the wood being effected by expanding the gas in the receptacle containing the wood, by further heating.

7. The herein-described process for coloring wood containing tannin, consisting in heating the wood in a closed receptacle to expand the air contained therein, then subjecting the wood to vacuum treatment to exhaust the air therefrom, and then forcing previously warmed ammoniacal gas into the wood by pressure, thereby causing such gas to permeate the wood throughout to color the same chemically by acting on the tannin.

8. The herein described process for coloring wood containing tannin, consisting in heating the wood in a closed receptacle to expand the air contained therein, then subjecting the wood to vacuum treatment to exhaust the air therefrom, and then forcing ammoniacal gas into the wood by pressure, thus causing such gas to permeate the wood throughout to color the same chemically by acting on the tannin, such pressure for the permeation of the wood by the gas being effected by expanding the gas, in the receptacle containing the wood, by heat.

9. The herein described process for coloring lumber containing tannin, consisting in subjecting the wood to a vacuum process in



a closed receptacle to exhaust the air therefrom, and then forcing ammoniacal gas into the wood by pressure, thus causing such gas to permeate the wood throughout, so that the  
5 action of the said gas on the tannin in the wood will color the same chemically, such pressure for the permeation of the wood by the gas being effected by expanding the gas, in the receptacle containing the wood, by  
10 heat.

10. The herein described process for coloring wood containing tannin, consisting in employing two communicating receptacles or cylinders in which the wood to be treated  
15 is confined, subjecting the wood to the action of a vacuum treatment to exhaust the

air therefrom, then subjecting the wood to the action of ammoniacal gas under pressure in one of the said receptacles or cylinders in which the gas is caused to permeate the  
20 wood throughout, and then extracting the gas from the treated wood by a second vacuum action and pumping the gas thus extracted from the treated wood over into the other receptacle or cylinder, thus pro-  
25 viding against loss of the gas.

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

WILLIAM AUGUSTUS HALL.

Witnesses:

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J. D. KLINGE.