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M. SMITH

TREATMENT OF WOOD AND LIKE POROUS MATERIAL

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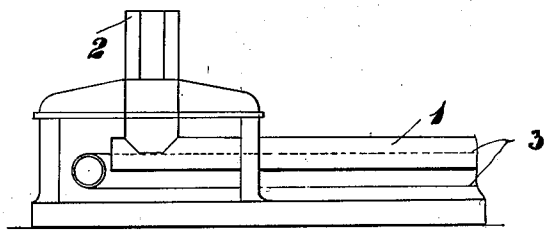


FIG. 1.

FIG. 2.

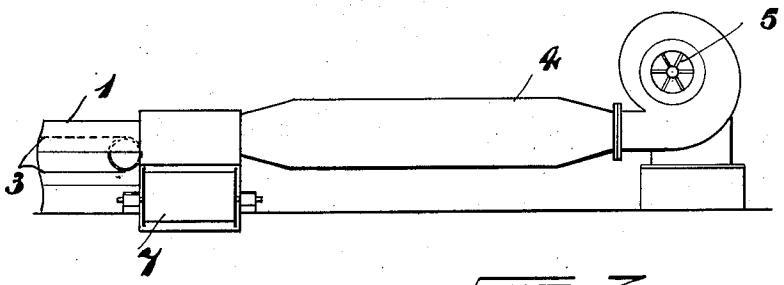
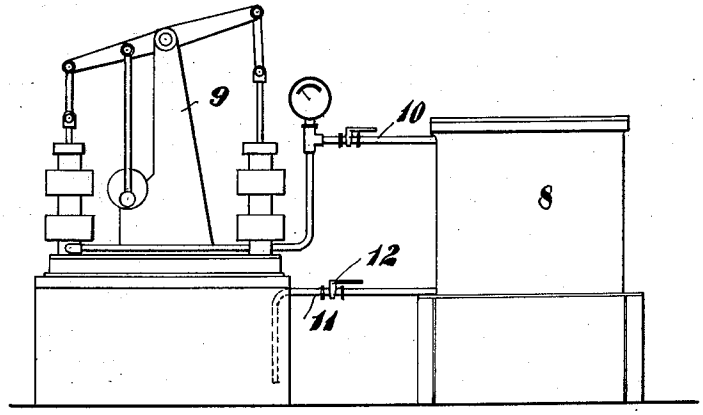


FIG. 3.



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TREATMENT OF WOOD AND LIKE POROUS MATERIAL.

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This invention comprises improvements in the method of treating wood and like porous material and has particular, although not exclusive, reference to the treatment of wood to be utilized in the manufacture of lead and similar pencils.

The principal object of the invention is to provide an improved method of and means for seasoning and softening wood of varied kinds and like porous materials and in particular means for seasoning and softening wood of varied kinds, which are not naturally suitable for use in the manufacture of lead and like pencils, and by such treatment render the wood particularly adaptable for such manufacture.

Another object of the invention is so to treat the wood as to inhibit warping therein and in articles made therefrom.

A further object of the invention is to enable, by the improved seasoning and softening process, freshly cut or "green" wood to be utilized for lead and like pencil making; while a further object is to produce in the treated wood, evenly and uniformly throughout its mass, a desirable and pleasing tint.

Heretofore, it has been proposed to treat wood by subjecting same to the action of air heated to a relatively high temperature but experience has proved that while such treatment effects a browning of the wood the requisite softening is not produced, neither is it possible to treat satisfactorily "green" wood in this way particularly when employed in the manufacture of pencils, as wood subjected to such treatment is liable to be rendered irregular and uneven, and the treatment is often destructive to the wood.

The principal feature of the present invention consists in the treatment of wood or like porous material by impregnating same with the vapour or vapours of softening media.

The primary purpose of this treatment is to soften the wood or the like but an effect consequent upon or incidental to the treatment is that the tendency for the wood to warp may be inhibited.

A further feature of the invention consists in effecting such impregnation at a comparatively high temperature whereby not only is the softening media vapourized but additionally desired tinting of the wood is effected.

Another feature of the invention consists in treating wood or the like by subjecting it to and/or causing it to be impregnated wholly or partially by a softening medium or mediums such for example as soap solution, Turkey red oil, oil emulsion, or other convenient or approved oleaginous matter and in subsequently vapourizing or partially vapourizing (preferably at a comparatively high temperature) the softening medium or mediums employed so that the vapours from the softening media penetrate the wood. A suitable emulsion for impregnating the wood is 18% emulsion of Turkey red oil in water.

The invention may conveniently be applied by treating wood or the like in three steps or stages, firstly, initially drying the wood conveniently by subjecting same to the action of hot air at a suitable temperature and humidity; secondly, treating the dried wood with a suitable softening medium so as to cause said medium to penetrate wholly or partially into the wood and thirdly, subjecting the wood so treated to a final heating by hot air at a comparatively higher temperature so as to vapourize the softening medium.

In vapourizing the softening medium it is assumed that the oily vapour therefrom impregnates the wood or the like and produces the same desirable effects as if the wood had actually been impregnated with the oil or softening medium, but all undesirable effects are eliminated. One of the undesirable effects in the present known method of treating wood with oil or similar softening medium for use in the manufacture of pencils is that the oil acts as a deterrent to the gluing together of the wood parts or slats forming the pencil. By the present process, however, this disadvantage is overcome, and a further feature, therefore, may be said to reside in the provision of means for producing wood having "oil impregnated" characteristics and which will effectively take glue or the like for adhering purposes.

The treatment of wood as above, in addition to effectively seasoning and softening same, produces an even and uniform tinting of the wood throughout the entire body thereof.

The term "softening" as used in this specification does not refer in any way to suppleness of the wood and by way of illustration it may be said that a wood that has been treated in accordance with this invention is

softened in that it can be cut more readily. The present invention is therefore distinct and separate from processes of treating the wood which render the wood more supple and more readily moulded.

For the purpose of more fully describing the nature of this invention reference will now be made to the accompanying drawings, wherein:—

Fig. 1 illustrates in side elevation a portion of an apparatus applicable for use in carrying out an initial drying of the wood or the like in the treatment according to the present invention.

Fig. 2 illustrates in side elevation a continuation of the apparatus shown in Fig. 1.

Fig. 3 illustrates in side elevation another part of apparatus applicable for use in carrying out this invention.

In one convenient method of carrying out the invention, as applied to the treatment of wood for use in the manufacture of pencils, the newly cut or "green" wood is cut into the required slats and introduced into the one end of an elongated drying chamber or oven 1, from a hopper 2. The slats are traversed by suitable means such as a conveyor 3 through the length of this chamber 1 and during their travel are acted upon by a flow of hot air which is introduced at the opposite end of the chamber 1 to that at which the slats are inserted and flows through the chamber in an opposite direction to the travel of the wood.

The air is heated by passing same through an air heating chamber 4 prior to its passage through the drying chamber 1, said chamber 4 containing suitable electric or other heating elements by which the air in passing through the chamber is heated. A suitable blowing fan 5 located at the air inlet end of heating chamber 4 functions to force air through said chamber and the drying chamber or oven 1.

The temperature of the hot air when entering the chamber in the first or drying operation is advantageously in the neighorhood of 220° to 260° F., said air being rendered increasingly humid by its passage across the slats undergoing treatment. It will be appreciated that the temperature of the air gradually decreases and its relative humidity increases as same travels along the chamber 1, the wood thereby meeting a gradually increasing heat and decreasing humidity during its movement to the delivery end of the chamber.

This initial drying of the wood slats may, under certain circumstances, be dispensed with.

After the initial drying of the wood slats by the hot air (if such initial drying is effected) same are delivered from the drying chamber 1 by any suitable evacuating means and suitably fed into an impregnating chamber or vessel 8 into which is introduced a softening liquid i. e. any suitable liquid or medium having a softening effect on wood. This liquid or medium is caused by any known or suitable means, such as a vacuum, to penetrate the surface of the wood.

The production of a vacuum in the impregnating chamber 8 may be effected by means of a vacuum pump such as 9 which, when the chamber 8 has received the required quantity of wood slats and has been sealed to the outer atmosphere, is set in motion to withdraw the air through the pipe 10. A drain pipe 11 with cock 12 may be furnished for draining superfluous liquid from the chamber 8.

The wood slats after the partial impregnation are transferred to a hot air chamber similar to the chamber 1 in which the initial drying is effected, but working at a higher temperature cycle. The purpose of this final heating at a comparatively high temperature is to effect a vapourizing of the softening medium to cause the vapour (preferably of an oleaginous nature) to penetrate the whole mass or body of the wood. This effects a uniform softening of the wood and also causes same to be tinted to a rich and pleasing colour evenly and uniformly throughout the mass.

The temperature of the final heating chamber controls the extent of vaporization, and wood treated in accordance with this invention is free from objectionable properties due to apparent retention of the medium, so that in this respect for practical purposes the medium is in effect driven off while owing to the effectant result of the process complete driving off of the medium in the usual sense of the term cannot be accepted.

While no definite theory is advanced of the process, the advancement of such a theory not being thought necessary for a proper understanding of the invention, and the physical mechanism of the process being apparently so complex that it is not desired to restrict the application by virtue of the process being interpreted with reference to such a theory, it is suggested that in vaporizing the softening medium as above described the vapor thereof impregnates the wood or other substance by a process of absorption by, or passing through, the cellulose structure of the wood and thereby softens the wood and imparts to it the desired properties outlined herein.

Further, it is to be understood that the expression "vaporization" as applied to the softening medium in this specification embraces both complete and partial vaporization. For example, wood heated with cod oil emulsion is subjected to a final heat treatment of, say 230°–240° F. This is not sufficient to effect vaporization of cod oil per se but it is found in accordance with the present process that the oil completely penetrates the wood in company with the water and for this reason

the term "vaporization" is employed as being suitable under the circumstances.

By the employment of the process according to this invention hard, resinous or patchy wood or wood which otherwise is unsuitable for the purpose, can be employed in the manufacture of pencils; while further, by this treatment the wood is so effected that warping therein and in articles made therefrom is inhibited.

Another desirable effect obtained by the treatment in accordance with this invention is that pieces of wood such for example as wood slats, which although of the same or similar species have before treatment different properties such for example as degree of hardness and tint or colour, are rendered more uniform in regard to these properties. Further in the carrying out of the present invention the results obtained and particularly the change in the aforementioned properties of the wood can be readily varied within comparatively wide limits to meet existing requirements by varying the nature of oil or other softening medium employed, and where oil emulsion is utilized, by varying the percentage of oil in such emulsion, as also by varying the degree of evaporation of said oils or the like in the wood.

Additionally, wood treated by the process in accordance with the present invention is effectively seasoned, softened and tinted and rendered ready for use in a far more expeditious manner than has heretofore been possible.

Claims—

1. The treatment of wood and like porous material by impregnating said wood to a suitable extent with softening medium (preferably of an oleaginous nature) and subsequently subjecting the impregnated wood to heat sufficient to vapourize the softening medium and cause the vapour thereof to impregnate the wood.

2. The treatment of wood or like porous material, which consists in impregnating the same to a predetermined degree with a softening medium and subsequently vaporizing said medium so that the vapor thereof impregnates the wood by a process of absorption by or passing through the cellulose structure of the wood and thereby softens the wood.

3. In the treatment of wood and like porous material initially drying the wood by subjecting same to the action of hot air, partially impregnating the dried wood with a softening medium (preferably of an oleaginous nature) and finally vapourizing the softening medium at a comparatively high temperature.

4. In the treatment of wood and like porous material, initially drying the wood by the action of hot and humid air, partially impregnating the dried wood with softening medium (preferably of an oleaginous nature) under the influence of a vacuum and finally vapourizing said softening medium at a comparatively high temperature to cause same to penetrate the wood.

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