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(12) # EUROPEAN PATENT SPECIFICATION

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(54) **Process for treating wood and product for treating wood.**

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Courier Press, Leamington Spa, England.

Description

The invention relates to a process for treating wood in which a wood preservative is inserted into one or more recesses made in wood, whereupon these recesses are closed outwardly.

The treatment of wood with a wood preservative aims at protecting the wood preventively or curatively against attack by moisture, micro-organisms (for instance Basidiocymetes, Asomycetes), insects (for instance termites, Hylotropus Bajulus, Anobium Pictatum).

A similar process is generally known. Preferably a capsule is used. The process followed is then that first a hole is drilled in the wood, subsequently a glass capsule with the wood preservative is inserted into it and finally the drilling hole is closed with a plug, which is applied in it in a recess, in result of which the capsule breaks and its contents are freed and spread in the wood.

A drawback of this process is that wooden beams, window-frames, etc. forming part of supporting structures or wooden elements which are regularly charged, are weakened as a consequence of the remaining holes.

Another drawback is that the user of the capsules when breaking the capsules may come into contact with the contents thereof.

This may happen because the plug does not close well or because the capsule is not positioned deep enough in the shallow drilling hole.

In Dutch patent application 77 03412 it is i.a. suggested to apply a water repelling agent in the recess.

In European patent application 81 108689.1 (published under No. 0050839) it is elucidated that the use of a water repellent agent gives very great problems in practice with wood already painted. Not only is the expulsion of moisture strongly interfered with, but there also is a chance that locally the moisture content will increase as a result of the water expellent agent. If it rises above the critical value of 21% a chance of wood attack by development of wood decay fungus is very great. Also, the paint system can be damaged as a result of moisture accumulation on the surface of the wood. That is why in the European patent application it is proposed to apply a solution of a water binder in an organic solvent in recesses of a wooden product. In result hereof the objection of moisture accumulation is removed, but the application of a water binder has the drawback that the active substances which have to prevent wood attack, are locked up, in consequence of which a good penetration hereof in the wood is reduced. Consequently, also here the object aimed at, to wit prevention and combating, resp., of wood attack by micro-organisms, insects and bacteria is not fully achieved.

The invention provides a process which meets the above-mentioned drawbacks.

According to the invention in a process as mentioned at the beginning a solid material is applied in the recess together with the wood preservative in such a way that this solid material at least partly fills up the recess, said solid material having a reinforcing effect upon this wood when it absorbs water and expands in consequence thereof and/or when a permanent pressure is exerted upon it.

Preferably, also wood is applied having a lower water content than the wood treated, most preferably resin-free splint-wood or heart-wood. Splint-wood is young wood and has a less resin-rich cell structure than has for instance heart-wood. This property is of importance in view of the absorption capacity of the wood and the capacity to absorb free liquid. By applying wood for this which has been freed from resins and other fillers, this effect is not only strengthened, but it is also prevented that chemical reactions between the wood preservative substances and these resins and other fillers can occur.

It is preferable to apply the wood material that is applied in the recesses of the wood to be treated in such a way therein that the wood preservative present therein is released in the direction of the fibres of the wood material applied.—So that means that the fibre direction of the wooden plug is the radial direction so that the fibre direction is the same as that of the surrounding wood. This does not only give the big advantage that the delivery of the wood preservative to the surrounding wood is accelerated, but also that it also distributes itself more uniformly in the surrounding wood. In consequence the chance of problems in painting the wood over is reduced.

In the process according to the invention a material having a lower water content that the wood treated is applied in the recesses together with the wood preservative thus the wooden plug will start absorbing water after application and in result expand more than the directly surrounding wood shrinks. In result a reinforcing effect is exerted upon the surrounding wood.

It is generally known that by nature wood contains water. This water can be present in two forms, to wit bound to the cell walls, the so-called inhibition water, and as free water in the cell cavities and vessels. This water is usually indicated as capillary or occlusion water. This water is present only if the cell walls are completely saturated. When drying wood first the free water disappears from the cell cavities. In for instance deal the moisture bound, in other words the inhibition water, amounts to about 29% at a maximum. In drying at a relative humidity of 80% a wood humidity of about 17% is created, at which a shrinkage of 1.25% in radial and 0.1% in the fibre direction occurs.

A deal plug, which is provided with a wood preserving organic agent and a moisture content of about 10%, will expand after application in the wood to be treated which is in constant contact with the open air and in result thereof has a higher moisture content. In addition to the rein-

forcing effect this has on the surrounding wood also a stabilising effect occurs because the moisture content of the plate treated decreases. This is in particular important for critical spots sensitive to wood attack. For if here the moisture content will surpass 21% the chance that the wood decay fungi most occurring in Europe, such as Polystictus versoclolor, Coniopohra Puteana, Gloephillum tradeuym are developed, is very great.

The invention also relates to a product for treating wood, comprising a wood preservative, and an absorbing material having a moisture content below 16% which expands on absorption of water, which material is enveloped by packing material which should largely be removed prior to use. Preferably this envelope consist of a capsule of smashable material, for instance glass. Preferably the absorbing material consist of wood, most preferably splint wood. Also cork is considered because it is a bit compressible. For if no protecting wrapping is applied it is advantageous to have the product according to the invention which is applied in a recess of the wood to be treated, taper a bit, so that the diameter of the portion of the plug which closes the recess present in the wood to be treated from the outside is somewhat larger than the bore-hole. For in consequence thereof the plug is anchored even more fixedly and no wood protective agent or glue which is present in the plug, can escape along the plug. If one wishes to glue the plug in the recess, one applied glue at the head of the plug and/or along the plug. By providing the plug with a recess, any excess of the glue is caught herein, so that the glue cannot come into contact with paint applied on the outside of the plug. In result thereof discoloration of the paint is prevented.

In a preferred embodiment of the wooden plug one also sees to it that the portion of the plug applied in the recess last is not oversaturated with the wood protective agent. This is of great importance in applying the plug for the sake of security of the users. Also, this has the great advantage that the wood protective agent cannot splash or run off after opening the packing or can run off in open seams of window frames.

In order that one does not meet with problems when painting the wood treated over, the impregnated plug can be provided on one end with an impermeable medium, for instance a galvanized wood screw, which closes the whole boring hole opening when applied. It is also possible to apply a non-impregnated plug on one end which by means of a compressible sealing disc for instance of aluminium foil is separated from the impregnated portion.

The invention is further illustrated with the aid of a number of embodiments, which are represented by Figures 1—9 incl.

The plug according to Figure 1 substantially consists of absorbent material having a low water content, for instance cork, wood flour, wood shavings, etc. Portion 1 is not impregnated with a wood protective agent.

Portion 2, however, is impregnated with the wood preservative. Both portions are mutually separated by a film of compressible material 3, which may for instance consist of a remainder of the packing material in which the plug was packed before use or of glue or resin. Partition 3 prevents the wood preservative in the impregnated portion 2 from penetrating in the non-impregnated portion 1, when in applying the plug in a recess of wood pressure is exerted on portion 1. If in the absorbent material a glue is present, the glue runner 4 sees to it that any excess of glue present cannot escape outwards.

When the plug of Figure 1 is inserted into a recess and a pressure is exerted from outside, the impregnated portion clamps in the non-pregnated portion.

In the embodiment according to Figure 2 the connection between the non-impregnated and impregnated portions is realized by means of a galvanized headless iron screw 5. Also a screw made of plastic material, for instance polyurethane, is considered.

In the embodiment according to Figure 3 the connection between the non-impregnated portion and the impregnated portion of the absorbent material is effected by means of a bayonet catch. By using a spring 6 on the inside and a compressible packing, both portions can expand without the total length of the plug being influenced. This is of great importance in view of the stability of the plug in the wood and for a paint layer applied thereover.

In the embodiment according to Figure 4 use has been made of a plastic compressible glue layer 7. Because hereof the packing material 3 closing the impregnated portion need not be compressible.

In the embodiment according to Figure 5 use is made of a glass capsule 8, to which a non-impregnated plug 1 has been screwed. A sealing ring 11 made of for instance cork with aluminium foil or rubber sees to it that the wood protective agent in the impregnated portion 2 cannot diffuse in the portion 1. When smashing in this capsule the glass wrapping breaks and the broken glass and the absorbent material are impressed in such a way that the whole boring hole is filled up completely all the same. After some time the absorbent mass will expand by moisture absorption from the surrounding wood and extra reinforce the whole.

Figure 6 also relates to an embodiment with a glass wrapping. In this embodiment a galvanized iron screw 9 is present. When placing the capsule the screw will smash the glass wrapping and will in consequence be anchored fixedly in the surrounding absorbing material. This embodiment has the advantage that no glue need be used, whilst moreover no wood protective agent can escape along the screw. There is no chance of splashing when applying the capsule either. The whole can be finished with a wood repair agent,

so that also the substrate for the paint system to be applied over it is fully suitable for applying the paint over it.

In the embodiment according to Figure 7 use is only made of an impregnated plug 10 which is reinforced with nylon or galvanized gauze. Also this offers the advantage that no contact between the wood protective agent and the user can take place. The layer of sealing material 3, which for instance can consist of aluminium foil reinforced with paper prevents the wood protective agent from penetrating towards the paint on the outside of the wood treated. This effect can even be reinforced by finishing the whole with a two-components glue, which is impermeable to polar and apolar organic liquids.

In Figure 8 use is again made of a galvanized iron screw, which is screwed in the impregnated portion of the absorbent material. By applying on the other end of the compressible material a compressible foil 3, the plug can expand without the total length of the whole product being longer. This foil does see to a reinforcement of the whole.

In the embodiment according to Figure 9 use is made of a flat screw 9 of galvanized iron or a plastic and a closed capsule of glass. The capsule is surrounded by a thin foil of plastic, for instance polyethylene foil or of polyvinylchloride foil. The whole is constructed such that after application of the glass capsule in the boring hole the capsule can be smashed by screwing the screw on. In case of a correct selection of the contents of the capsule, to wit by seeing to it that an organic liquid is present therein, in which the foil of plastic surrounding the glass capsule initially, dissolves, the wood protective agent can penetrate the wood to be protected.

Instead of with a plastic foil the capsule with screw can also be wrapped in nylon or galvanized gauze (8). Also this packing need not be removed, no more than a wrapping of plastic foil before applying the capsule in the boring hole. This embodiment has the advantage over the known capsule, the wrapping of which consists wholly of glass, that after inserting the capsule into the boring hole, the screw applied as closure is inserted into the boring hole simultaneously with the capsule. When using the known capsules after application of the capsule for closing the boring hole a closing plug is to be applied in a separate act. It then could happen that such a plug was inserted after it had been forgotten to apply first the glass capsule. This is impossible when applying a closing screw, which is applied integrally with the capsule.

Figure 10 relates to an embodiment in which use is made of a unit consisting of a sealed capsule (8) of smashable material, for instance glass, filled with a solution of a wood preservative and a plug (1) of material impermeable to wood preservative, for instance heart-wood, fixedly connected therewith for instance by glueing. If the plug consists of hardwood, in particular of European oak, the plug moreover does not deform in smashing. When the plug is internally provided with a cavity (12) into which a protruding portion (13) of the sealed capsule fits, yet a relative large amount of wood preservative can be taken up into the unit, although a large part of the length of this unit is taken by the plug. This is in particular of importance when treating wood structures having a smaller thickness, for instance window-frames.

In general it is advantageous to select the wrapping material of the capsule, for instance the glass such that it does not transmit ultraviolet light. This promotes the keeping qualities of the wood preservative present in it.

Finally, it is remarked that the expression wood preservative is to be understood in the broadest sense. Also agents, which as such do not exert a killing effect on living organisms, but see to a medium in which living organisms cannot multiply are meant. For instance, a solution of paraffin in an organic solvent can be applied. When this solution penetrates into the spaces between the wood fibres and the organic solvent evaporates partially, the paraffin remains in the spaces, in result of which no living organisms can develop therein.

Claims

1. A process for the treatment of wood, comprising inserting a wood preservative into one or more recesses in the wood, whereupon this recess is also outwardly closed, characterized in that with the wood preservative a solid material is inserted into the recess in such a way that this fills up the recess at least partially, said solid material having a lower water content than the wood treated and exerts a reinforcing effect upon this wood when it absorbs water and in result expands.

2. A process according to claim 1, characterized in that the solid material with the lower water content is resin-free splint wood or heart-wood.

3. A process according to claim 2, characterized in that the wood material to be inserted into the recesses of the wood to be treated, is inserted therein in such a way that the delivery of the wood preservative present therein occurs in the direction of the fibres of this wood material.

4. A process according to any of the claims 1—3, characterized in that the combination of wood preservative and solid material is inserted into the recess in the form of a capsule of smashable material which is smashed after application of the capsule in the recess.

5. A process according to claim 4, characterized in that the capsule is sealed and contains a solution of the wood preservative and at the top is provided with the solid material having a low water content, said material being smashed inwards after application of the capsule in the recess, in result of which it smashes the capsule and effects the closing of the recess.

6. A product for the treatment of wood comprising a wood preservative, characterized in

that an absorbent material having a moisture content of below 16% by weight which expands when absorbing water, is present and that this material together with the wood preservative is enveloped by packing material which should largely be removed prior to use.

7. A product according to claim 6, characterized in that the solid material having a water content of below 16% by weight consists of a portion not impregnated with wood preservative and a portion impregnated with wood preservative.

8. A product according to claim 7, characterized in that the portion impregnated with wood preservative is separated from the non-impregnated portion by means of a compressible sealing disc.

9. A product according to any one of the claims 6—8 consisting of a capsule of smashable material, for instance glass, in which a wood preservative is present and which is characterized by a closing constructed as a screw, which can be applied in one single act together with the capsule in a boring hole.

10. A product according to any one of the claims 6—9 consisting of a sealed capsule of smashable material, for instance glass, in which a solution of wood preservative is applied and a plug fixedly connected therewith on top made of material preferably impermeable to the wood preservative, for instance heart-wood.

Patentansprüche

1. Verfahren zum Behandeln von Holz durch Einbringen eines Holzschutzmittels in eine oder mehrere im Holz befindliche Ausnehmungen, worauf diese Ausnehmung auch nach außen abgeschlossen wird, dadurch gekennzeichnet, daß mit dem Holzschutzmittel ein festes Material in die Ausnehmung derart eingebracht wird, daß dieses die Ausnehmung zumindest teilweise ausfüllt, wobei besagtes festes Material einen geringeren Wassergehalt als das behandelte Holz aufweist und auf dieses einen Verstärkungseffekt ausübt, wenn es Wasser absorbiert und sich demzufolge aufweitet.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß das feste Material mit dem niedrigeren Wassergehalt harzfreies Splintholz oder Kernholz ist.

3. Verfahren nach Anspruch 2, dadurch gekennzeichnet, daß das in die Ausnehmungen des zu behandelnden Holzes einzubringende Holzmaterial darin in solcher Weise eingebracht wird, daß die Abgabe des darin vorhandenen Holzschutzmittels in Richtung der Fasern dieses Holzes erfolgt.

4. Verfahren nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Kombination von Holzschutzmittel und festem Material in die Ausnehmung in der Form einer Kapsel aus zertrümmerbarem Material eingebracht wird, welches nach Einsetzen der Kapsel in die Ausnehmung zertrümmert wird.

5. Verfahren nach Anspruch 4, dadurch gekennzeichnet, daß die Kapsel versiegelt ist und eine Lösung des Holzschutzmittels enthält und am Oberteil mit dem festen, einen niedrigen Wassergehalt aufweisenden Material versehen ist, welches Material nach Einsetzen der Kapsel in die Ausnehmung einwärts geschmettert wird, wodurch es die Kapsel zertrümmert und das Verschließen der Ausnehmung bewirkt.

6. Ein ein Holzschutzmittel enthaltendes Erzeugnis für das Behandeln von Holz, dadurch gekennzeichnet, daß ein absorbierendes Material vorgesehen ist, das einen Feuchtigkeitsgehalt von weniger als 16 Gew.-% aufweist und sich beim Absorbieren von Wasser ausdehnt, und daß dieses Material zusammen mit dem Holzschutzmittel durch Verpackungsmaterial umhüllt ist, welches vor dem Gebrauch weitgehend entfernt werden sollte.

7. Ein Erzeugnis nach Anspruch 6, dadurch gekennzeichnet, daß das feste, einen Wassergehalt von weniger als 16 Gew.-% aufweisende Material aus einem mit Holzschutzmittel nicht getränkten Teil und aus einem mit Holzschutzmittel getränkten Teil besteht.

8. Ein Erzeugnis nach Anspruch 7, dadurch gekennzeichnet, daß der mit Holzschutzmittel getränkte Teil von dem nicht getränkten Teil mittels einer zusammendrückbaren Dichtungsscheibe getrennt ist.

9. Ein Erzeugnis nach irgendeinem der Ansprüche 6 bis 8, bestehend aus einer Kapsel aus zertrümmerbarem Material, zum Beispiel Glas, in welcher sich ein Holzschutzmittel befindet und welche durch einen als Schraube ausgebildeten Verschluß gekennzeichnet ist, der gleichzeitig zusammen mit der Kapsel in ein Bohrloch eingesetzt werden kann.

10. Ein Erzeugnis nach irgendeinem der Ansprüche 6 bis 9, bestehend aus einer versiegelten Kapsel aus zertrümmerbarem Material, zum Beispiel Glas, in welcher sich eine Lösung eines Holzschutzmittels befindet, und aus einem mit derselben oben verbundenen Stopfen aus einem für das Holzschutzmittel vorzugsweise undurchlässigem Material, beispielsweise Kernholz.

Revendications

1. Procédé de traitement du bois comprenant l'insertion d'un agent préservateur dans un ou plusieurs évidements ménagés dans le bois, à la suite de quoi cet évidement est fermé de l'extérieur, caractérisé en ce qu'une matière solide est insérée dans l'évidement en même temps que l'agent préservateur et de telle manière que cela remplisse au moins partiellement l'évidement, ladite matière solide présentant une teneur en eau inférieure à celle du bois à traiter et ayant pour effet de renforcer ce dernier, lorsqu'il absorbe de l'eau et en conséquence se dilate.

2. Procédé suivant la revendication 1, caractérisé en ce que la matière solide à faible teneur en eau est du bois d'aubier dépourvu de résine ou du bois de coeur.

3. Procédé suivant la revendication 2, carac-

térisé en ce que la matière devant être insérée dans les évidements dans le bois à traiter y est introduite de telle façon que la distribution de l'agent préservateur du bois contenu dans ladite matière, s'effectue dans la direction des fibres de cette matière.

4. Procédé suivant l'une quelconque des revendications 1 à 3, caractérisé en ce que la combinaison de l'agent préservateur et de la matière solide est insérée dans l'évidement sous la forme d'une capsule réalisée en une matière cassable, qui est brisée après application de la capsule dans l'évidement.

5. Procédé suivant la revendication 4, caractérisé en ce que la capsule est scellée et contient une solution d'agent préservateur et en ce que la matière solide à faible teneur en eau est placée à sa partie supérieure, ladite matière étant frappée en direction de l'intérieur, après introduction de la capsule dans l'évidement, en conséquence de quoi elle brise la capsule et engendre l'obturation de l'évidement.

6. Produit destiné au traitement du bois, comprenant un agent préservateur du bois, caractérisé en ce qu'il contient une matière absorbante ayant une teneur en humidité inférieure à 16% par poids, laquelle se dilate lorsqu'elle absorbe de l'eau et en ce que cette matière, ainsi que l'agent préservateur sont enveloppés par une matière d'emballage, qui doit être complètement retirée avant utilisation.

7. Produit suivant la revendication 6, caractérisée en ce que la matière solide à teneur en eau inférieure à 16% par poids, est constituée d'une partie non imprégnée d'agent préservateur du bois et d'une partie imprégnée d'un tel agent.

8. Produit suivant la revendication 7, caractérisé en ce que la partie imprégnée d'agent préservateur du bois est séparée de celle non imprégnée par l'intermédiaire d'un disque d'obturation que l'on peut comprimer.

9. Produit suivant l'une quelconque des revendications 6 à 8, consistant en une capsule de matière cassable, telle que du verre, dans laquelle se trouve un agent préservateur du bois et caractérisé en ce qu'une fermeture, construite à la manière d'une vis, peut être engagée d'un seul coup en même temps que la capsule dans un trou.

10. Produit suivant l'une quelconque des revendications 6 à 9, consistant en une capsule scellée constituée en une matière cassable, telle que du verre, dans laquelle est versée une solution d'agent préservateur du bois, tandis qu'une cheville constituée de préférence en une matière imperméable à l'agent préservateur du bois, tel que par exemple du bois de coeur, est fixée à sa partie supérieure.

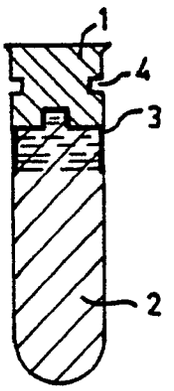


FIG.1

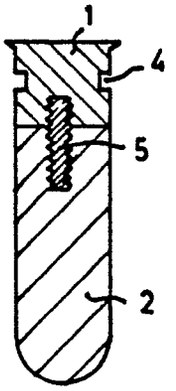


FIG.2

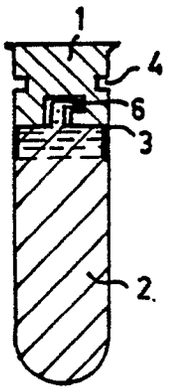


FIG.3

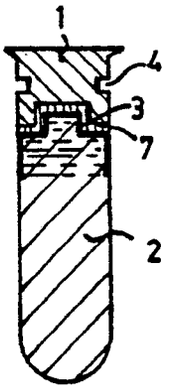


FIG.4

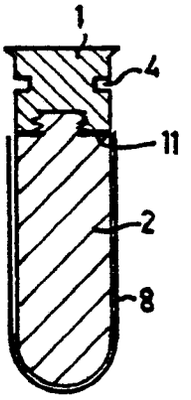


FIG.5

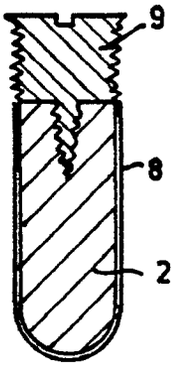


FIG.6

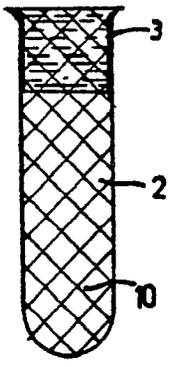


FIG.7

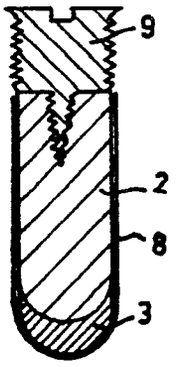


FIG.8

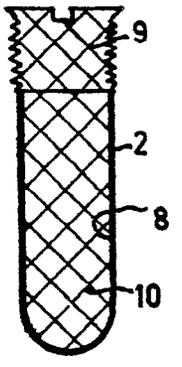


FIG.9

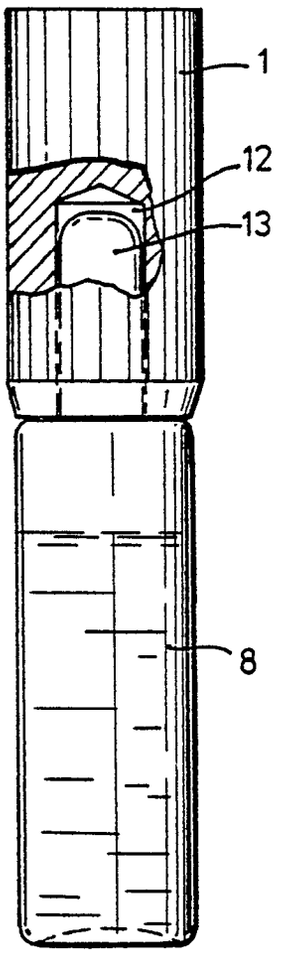


FIG. 10