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(54) PRESERVATIVE FOR WOOD AND WOOD-BASED MATERIALS

(71) We, DESOWAG -BAYER HOLZSCHUTZ G.M.B.H., a body corporate organized under the laws of the German Federal Republic, of 4000 Düsseldorf 30, Ross-Strabe 76, German Federal Republic, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a preservative for wood and wood-based materials, and to a process for the production of the preservative with a given viscosity.

The previously proposed oily wood preservatives, in which for example mineral oil is used as a solvent, are low-viscosity oils which possess a certain ability to penetrate wood in accordance with the type of wood, timber or wood based material (for example pine sapwood). However, the small quantity applied per operation is a disadvantage in the surface treatment of wood or wood-based materials, for example by brushing, rolling or spraying processes. Thus in the case of wood preservatives having a base of white spirit (boiling range 140 to 215°C.) the quantity applied, that is to say the amount of wood preservative applied per unit area, for example on planed timber, per operation, is very small being 0.050 to 0.080 kg./m². In order to achieve adequate protection of the timber in many fields of application larger quantities of preservative are necessary. There therefore already exist in many countries certain regulations, for example in the Federal Republic of Germany DIN 68 800 "Wood preservatives in building", according to which for effective timber protection considerably larger quantities of wood preservative have to be applied according to the thickness of the wood in order to meet these requirements. As a result of the large quantity required, for example of over 0.200 kg./m². up to about 0.300 kg./m²., in the case of planed timber this would require a fourfold to fivefold surface treatment with a normal wood preservative. This makes labour-intensive and costly processes necessary.

It has been proposed to incorporate montmorillonite derivatives in paints and printing inks as agents for rendering them thixotropic (Römpp, Chemie-Lexikon, 1972, page 328).

Furthermore, a biocidal preparation which is intended for timber protection has already been proposed and substantially consists of 5 to 50 parts of oil or synthetic resin, 0 to 6 parts of pigment, 1 to 10 parts of biocide and 40 to 85 parts of a conventional petroleum-based solvent or mixture of such solvents as well as in addition 2 to 20 per cent by weight of N-methyl-2-pyrrolidone, reckoned on the total of the other components.

However, the use of resins, for example alkyd resins, in timber preservatives containing fungicides inhibits penetration of the active principles into the timber and in order to avoid this disadvantage, it is necessary to incorporate the N - methyl - 2 - pyrrolidone in the preparation.

It would be desirable to provide a preservative for wood and wood based materials which makes it possible to apply the desired or required quantities on to the surface of the wood or of the wood based material, if possible in a single operation. As a result of the operation it is desirable to reduce the odour which frequently occurs when using or applying timber preservatives based on oily solvents. Further it is desirable to provide a wood preservative which can also prevent to a certain extent the natural swelling of the wood. Finally, the preservative should adhere well to the surface of the wood or wood-based material and satisfy the possibility of providing a decorative surface without reducing the penetrability of the fungicides and/or insecticides present in the preservative.

We have carried out numerous experiments with different wood preservatives based on oily organic solvents. In these experiments tests were carried out, *inter alia*, on means for preserving wood and wood-based materials which had been produced by using more than 50 per

cent by weight, preferably more than 72 per cent by weight, of a non-volatile oily or oil-like solvent, fungicides and/or insecticides as well as swelling agents. The swelling agents which were used experimentally in this case were the swelling agents conventionally used in the paint and printing ink industry, for example montmorillonites or expanding clays.

In these experiments, however, it was found that such preservatives did not possess an adequate adhesion to the wood so that after drying, there was frequently left behind a poor-looking coating which in a few cases even crumbled off.

In addition, experiments were carried out in which wood preservatives were used which consisted of more than 50 per cent by weight, preferably more than 72 per cent by weight, of a non-volatile oily organic solvent, fungicides and/or insecticides and also a binder or thixotropic binder. However, in these experiments it was difficult or impossible to apply the desired quantity of preservative and, it was not possible to suppress the objectionable smell of the preservative.

According to one aspect of the present invention there is provided a preservative for wood or wood-based material, comprising over 50% by weight of a base, all or a major proportion of which is an organic, oily solvent, or mixture of solvents, of low volatility having an evaporation number exceeding 35 as determined in accordance with DIN 53170 and a flash point above 30°C., from 3 to 15% by weight of one or more binders (reckoned on solid material) dispersible or soluble in said base, from 0.3 to 7% by weight of one or more insecticides soluble in said base and/or in said binder(s), from 0.5 to 10% by weight of one or more fungicides soluble in said base and/or in said binder(s), and from 3 to 10% by weight of at least one organic or finely-divided inorganic swelling agent, the proportion by weight of binder(s) to swelling agent(s) being from 4:1 to 1:3.3.

The present preservative comprises preferably more than 72 per cent by weight of said base; preferably from 0.5 to 4 per cent by weight of said insecticide; preferably from 1 to 7 per cent by weight of said fungicide; preferably 4 to 10 per cent by weight of said binder; and preferably 4 to 7 per cent by weight of said swelling agent which may be an inorganic and/or an organic swelling agent, the proportion by weight of the binder to the swelling agent being preferably from 2:1 to 1:1.3.

It is important to maintain the quantities and also proportions by weight stated. If, for example, the proportion of the binder(s) to swelling agent(s) falls below the proportion stated, the danger exists that the timber preservative will not have an adequate adhesiveness to wood or that after the agent has dried, sandy or poor surfaces will result or else under certain conditions there can occur a reduction in the efficacy of the preservative. If, on the other hand, the proportion of swelling agent(s) to binder(s) should fall below the proportions by weight stated, it is no longer possible to apply the preservative to the same extent in the desired quantities. Furthermore, it is also not possible to reduce the smell to the desired extent. The binder used in the present preservative may comprise a linseed oil varnish (and/or one or more resins soluble in the oily base, such resins preferably being alkyd resins or modified alkyd resins, polyacrylate esters, polypropylene chloride, copolymers of vinyl chloride and/or hydrocarbon resins or mixtures thereof.

It is also possible to use other resins which are dispersible, preferably soluble, in the oily base, for example phenol resins and/or indene-coumarone resins. The binder is conveniently added during the manufacture of the preservative in a finely-divided form, for example in the form of a dispersion (emulsion or suspension), preferably in the form of a solution.

Preferred binders include oil-modified and/or polyurethane-modified alkyd resins.

It has further been found desirable for the proportion by weight of the base to the swelling agent(s) to be from 10:1 to 25:1, preferably from 13:1 to 20:1, thereby ensuring that the preservative can penetrate well into the timber.

In one embodiment of the present preservative, from 0.1 to 7 per cent by weight, preferably from 0.5 to 3 per cent by weight, of the oily base consists of one or more readily volatile or medium-volatile organic solvents which are soluble in the oil base, and/or of one or more plasticisers or fixers, provided that the resulting base mixture also possesses an evaporation number of over 35 and a flash point of over 30°C. Preferably, the readily volatile or medium-volatile organic solvents are hydrophilic solvents which are soluble in the oily base and which are preferably monohydric or polyhydric alcohols with 1 to 7 carbon atoms and/or ethers, preferably glycol ethers and/or esters and/or ketones. Preferred hydrophilic solvents include methanol, ethanol, *n*-propanol, iso-propanol, benzyl alcohol, butyl acetate, ethylene glycol acetate, methylethylketone or a mixture of two or more of these compounds.

By appropriate choice of the hydrophilic solvent, it is possible to improve the swelling capacity of the swelling agent.

The swelling agent or swelling agents are swellable in the oily base and may be in the form of finely-divided inorganic swelling agents, such as finely divided swelling clays, montmorillonites, silica gels, aluminium stearate, calcium stearate, magnesium stearate, or organic swelling agents such as hardened castor oil, or mixtures or several such swelling agents.

Where the swelling agent is finely-divided it preferably has a mean particle size of 1 to 30 μm., more preferably 4 to 20 μm., before it is incorporated in the present preservative.

Preferably, the viscosity of the present wood preservative is from 300 to 4,000 cP (measured at 20°C.), more preferably 1,500 to 3,000 cP (measured at 20°C.).

By keeping to the weights and proportions by weight stated, it is possible to make the present preservative with such a viscosity that it can be applied to wood in a single operation, for example by brushing or by spraying using conventional spraying apparatus, for example airless appliances, spray guns, pressure jets, etc., or else by a rolling process. In a number of experiments, for example, it was possible in one operation to spray 0.300 to 1.000 kg./m². of wood preservative, it being possible also to apply or spray the preservative on to vertically standing planed surfaces, without its running off. Also where very large quantities of preservative were applied, for example quantities of 1.000 kg./m²., it was possible to obtain surfaces with a decorative effect.

Whereas in the preliminary experiments it was oberved that if the proportion of resin was too small or if the binder was completely omitted poor surfaces were obtained on the wood, in the case of the present wood preservative a smooth surface is formed and where the larger quantities are applied, for example over 0.600 kg./m²., it is formed as a visible thin film. It is surprising that if the proportions by weight stated are maintained, the penetration of the present wood preservative into the wood is not adversely affected, in spite of the presence of both the swelling agent(s) and the binder(s).

The aforesaid fixers or plasticisers which may constitute part of the solvent base are mainly those compounds which act as plasticisers on the binders used or which in addition are intended to prevent the volatilisation and/or crystallisation or precipitation of the active ingredients of the preservative. Preferred plasticisers include, for example alkyl, aryl, or aralkyl phthalates; preferably dibutyl, dioctyl and benzylbutyl phthalates; phosphate esters, preferably tributyl phosphate; adipates, for example di - (2 - ethylhexyl adipate; stearates and oleates, for example alkyl stearates or alkyl oleates, preferably butyl oleate, butyl stearate or amyl stearate; bis - (dimethylbenzyl) ether, ethyl *p* - toluenesulphonate, glycerol esters, glycerol ethers or high-molecular weight glycol ethers. Preferred fixers include those based on ketones and/or polyvinylalkyl ethers, for example ketones with alkyl, aryl or aralkyl groups, preferably benzophenone or ethylbenzophenone; polyvinylalkyl ethers, preferably polyvinylmethyl ether.

The organic non-volatile oil solvent with an evaporation number of over 35 as determined in accordance with DIN 53170 and a flash point of over 30°C., preferably over 45°C., used in the present preservative is a water-insoluble or sparingly soluble solvent, such as a mineral oil or an aromatic fraction thereof or a solvent mixture containing mineral oil, preferred solvents including white spirit, paraffin oil, gasoil and/or alkylbenzenes.

More preferred solvents include mineral oils with a boiling range of 170 to 220°C., white spirit with a boiling range of 170 to 220°C., spindle oil with a boiling range of 250 to 350°C., paraffin oil or aromatics with a boiling range of 160 to 280°C. and turpentine oil.

In addition it is possible to incorporate in the present preservatives dyestuffs, pigments, especially finely-divided pigment pastes, water repellents, odour correctors and inhibitors or anti-corrosive agents, marking agents and the like as may be necessary or desired. As the present wood preservative has in itself a very pronounced waterproofing action, the addition of water repellents is generally not necessary. In some cases, however, it is possible to use water-repellents, such as waxes, wool grease and the like in proportions by weight of 0.2 to 5 per cent by weight, preferably 0.5 to 2 per cent by weight, based on the weight of the preservative. Marking agents which may be used include for example, lithium compounds or cadmium compounds, and in one embodiment from 0.01 to 0.03 per cent by weight of an organic oil-soluble lithium compound is used as a marking agent.

A further advantage of the present preservative which may be of medium-viscosity to highly viscous, is the possibility of obtaining a glazing coat by stirring a pigment paste into the preservative during the production thereof or even into the finished preservative.

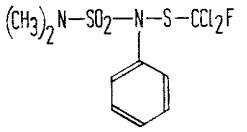
In order to inhibit any corrosive effects which the present preservative may have on iron or non-ferrous metals which come into contact with the preservative anti-corrosive agents, for example mandelic acid and/or benzotriazole may be added to the preservative, the benzotriazole and/or the mandelic acid being added in proportions by weight of 0.01 to 0.5 per cent by weight, preferably 0.05 to 0.1 per cent by weight, as described and claimed in the Specification of our Patent No.1,511,197.

The insecticide ingredient of the present preservative may be a conventional insecticide which is soluble in the oily solvent(s). Examples of suitable insecticides include for example carbamates, insecticidal chlorinated hydrocarbons and phosphate esters, preferably insecticidal alkoxy - phenyl - N - alkyl carbamates and/or alkyl - phenyl - N - alkyl carbamates as well as halogenated or non-halogenated thiophosphate esters or thiophosphonate esters, as well as lindane.

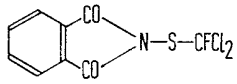
The fungicide ingredient of the present preservative may likewise be a conventional

fungicide which is soluble in the oily solvent(s). It has been found that it is preferable to incorporate the fungicides in different concentrations in dependence upon the nature of the fungicides. In one embodiment 3 to 10 per cent by weight, preferably 4 to 7 per cent by weight, of chlorophenol, preferably pentachlorophenol and/or tetrachlorophenol, may be used as a fungicide. In another embodiment 1 - trityl - 1,2,4 - triazoles are used in the preservative as fungicides. Particularly good effects can be achieved using bis - phenyl - (3-trifluoromethyl - phenyl) - 1 - (1,2,4 - triazolyl) - methane.

Another preferred embodiment consists in replacing the abovementioned fungicidal ingredient either wholly or partly by another fungicide, such as N,N - dimethyl - N'-phenyl - N' - fluorodichloromethylthio - sulphamide of the formula



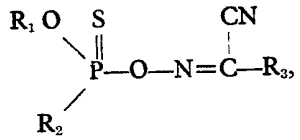
and/or N - fluorodichloromethylthio - phthalimide of the formula



Thus up to 80 per cent by weight, preferably up to 50 per cent by weight, of the first-mentioned fungicide is replaced by another fungicide. Such a mixture is particularly suitable for the simultaneous combating of wood-destroying fungi and wood-staining fungi, such as for example glue fungi.

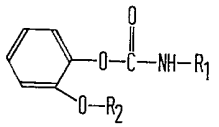
It is also possible to use other fungicides which are soluble in the oily base or mixtures of these fungicides with the abovementioned fungicides, such as for example, fungicidal oil-soluble naphthenates, preferably zinc and/or copper naphthenates; 8-oxyquinoline or its fungicidal oil-soluble salts or derivatives, preferably phenyl mercury - 8 - oxyquinolate; fungicidal compounds or derivatives or mixtures of chlorophenols, preferably compounds or mixtures of pentachloro-phenol and/or tetrachlorophenol with non-volatile amines, for example dehydroabietylamine; nitrophenols or nitrochlorophenols and/or nitrochlorobenzenes, especially 1,2 - dinitrotetrachlorobenzene and/or methyl benzimidazole - 2 - carbamidate and/or oil-soluble fungicidally active organic compounds containing metal, for example, copper, zinc, manganese, cobalt, chromium or mercury, for example in the form of caprylates, naphthenates, oleates and the like; fungicidal salts of N - nitroso - N - cyclohexylhydroxylamine, preferably the aluminium salt of N-nitroso - N - cyclohexylhydroxylamine and/or N - trichloromethyl - thiotetrahydrophthalimide. When using any of the abovementioned additional fungicides, for example N - nitroso-N - cyclohexyl - hydroxylamine and/or the naphthenates, oleates and the like; fungicidal aluminium salt of N - nitroso - N - cyclohexylhydroxylamine, however, it must be taken into account that these fungicidal compounds are only suitable for certain species of wood or wood fungi. In mixtures of fungicides it is also possible to include at the same time tar oil distillates and/or tar oils.

In a particularly advantageous embodiment, the present wood preservative contains from 0.5 to 7 per cent by weight, preferably 2 to 4 per cent by weight, of an insecticide mixture consisting of at least one insecticidal alkoxy - phenyl - N - alkyl - carbamate and/or alkylphenyl - N - alkyl carbamate soluble in the oily solvent, and at least one insecticidal halogenated or non-halogenated thiophosphate ester or insecticidal thionophosphonate ester of the general formula

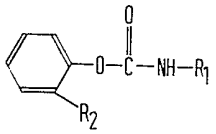


in which formula R_1 is an alkyl radical with 1 to 4 carbon atoms, R_2 is an alkyl radical or an alkoxy radical with 1 to 4 carbon atoms, or a phenyl radical and R_3 is a phenyl radical or a phenyl radical which is substituted with 1 to 3 halogen atoms or alkyl or alkoxy radicals, which ester is soluble in the oily solvent, the insecticide mixture containing the carbamate or the carbamate mixture in a proportion by weight of 3:1 to 1:3, preferably from 1:0.5 to 1:2, to the thiophosphate ester or thionophosphate ester or thionophosphonate ester or mixture thereof.

Preferably the insecticide mixture comprises an alkoxyphenyl - N - alkyl carbamate of the general formula

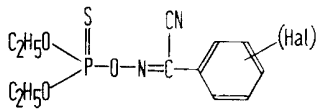


and/or an alkylphenyl - N - alkyl carbamate of the general formula



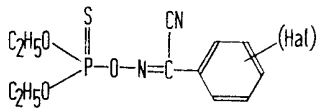
in each of which formulae R_1 is an alkyl radical with 1 to 4 carbon atoms, preferably a methyl radical, and R_2 is an alkyl radical with 1 to 5 carbon atoms, preferably an alkyl radical with 3 or 4 carbon atoms.

The aforesaid halogenated or non-halogenated thionophosphate ester may have the formula



and is preferably O,O - diethyl - O - (α-cyanobenzylidene - amino) - thionophosphate and/or (diethoxy - thiophosphoryloxyimino)-2 - chlorophenylacetonitrile.

Advantageously, the insecticide may be a mixture consisting of 2 - isopropoxy - phenyl-N - methyl carbamate and/or butylphenyl - N-methyl carbamate and an insecticidal halogenated or non-halogenated thionophosphate ester of the formula



Preferably O,O - diethyl - O - (α - cyanobenzylidene - amino) thionophosphate and/or (diethoxy - thiophosphoryloximino) - 2 - chlorophenyl acetonitrile.

The invention further provides a method of making the present preservative for wood or wood-based material wherein the binder(s) in an amount of from 3 to 15 per cent by weight and the swelling agent(s) in an amount of from 3 to 10 per cent by weight are incorporated with the remaining ingredients so as to provide the preservative with a viscosity of 300 to 4,000 cP (measured at 20°C.), preferably 1,500 to 3,000 cP (measured at 20°C.).

The method is preferably carried out by placing the oily solvent in a tank and, whilst stirring, adding the swelling agent or agents and then the fugicide(s) and insecticide(s), then the binder(s) and finally any necessary siccative(s) or other additives. The method is carried out at a temperature of 10 to 65°C., more preferably 30 to 55°C.

In another preferred embodiment of the method, the swelling agent(s) is (are) stirred or dispersed in the non-volatile oily solvent and one or more hydrophilic solvent(s) is (are) added in proportions by weight of 0.5 to 3 per cent by weight (reckoned on the finished preservative) either before, during or after the addition of the swelling agent(s), preferably after the addition of the swelling agent(s), and preferably after the swelling agent(s) the insecticide(s) and/or the fungicide(s) are added whilst stirring, followed by the binder(s) and then possibly the siccative(s) or other additives.

The present preservative is preferably applied in quantities of 0.200 to 1.000 kg./m², more preferably 0.250 to 0.500 kg./m²., and may be applied by brushing, rolling or spraying on to the wood or wood-based materials to be preserved.

The invention will now be illustrated by the following Examples.

Example 1

A wood preservative was made with the following composition:—

Pentachlorophenol (technical)	5.5 %
γ-hexachlorocyclohexane	0.5 %
N - dichlorofluoromethylthio - N',N' - dimethyl - aminosulphonanilide	0.5 %
White spirit, boiling range 145—210°C.	59.3 %
Aromatics, boiling range 150—213°C.	20.0 %
Siccative	0.2 %
Alkyl resin modified with polyurethane (100%, that is to say reckoned without solvent)	6.0 %
Swelling clay	6.0 %
Methanol	2.0 %
	100.00%

It was possible to obtain a waterproofing effect (according to U.S. Standard TT-W-5 72) with a WR value of 99%.

The preservative has a preventive action against insects, fungi and beetles.

Example 2

A wood preservative was made with the following composition:

Tributyl tin oxide	1.0%
N - dichlorofluoromethyl - thio-N',N' - dimethylamino - sulphonanilide ("Dichlofluanide")	0.5%
γ-hexachlorocyclohexane	0.5%
Aromatics, boiling range 150—213°C.	80.8%
Siccative	0.2%
Oil - modified alkyl resin (100%, that is to say reckoned without solvent)	10.0%
Hardened castor oil as swelling agent	2.0%
Montmorillonite as swelling agent	3.0%
Isopropyl alcohol	2.0%
	100.0%

It was possible to achieve a waterproofing effect (according to U.S. Standard TT-W-572) with a WR value of 90%.

The preservative acts as a preventive against insects, fungi and beetles.

Example 3

A wood preservative was made with the following composition:

Pentachlorophenol	5.5%
γ-hexachlorocyclohexane	1.0%
White spirit, boiling range 180—210°C.	60.3%
Aromatics, boiling range 185—213°C.	20.0%
Siccative	0.2%
Thixotropic alkyd resin (100%, that is to say reckoned without solvent)	6.0%
Montmorillonite	5.0%
Methanol	2.0%
	100.0%

It was possible to achieve a waterproofing effect (according to U.S. Standard TT-W 572) with a WR value of 96%.

The preservative acts as a preventive against insects, fungi and beetles and also destroys insects.

Example 4

A wood preservative was made with the following composition:

γ-hexachlorocyclohexane	1.0%
Aromatics, boiling range 187—213°C.	85.0%
Polybutyl methacrylate	5.0%
Swelling clay	6.0%
Benzyl alcohol	3.0%
	100.0%

It was possible to achieve a waterproofing effect (according to U.S. Standard TT-W-572) with a WR value of 98%.

The preservative acts as a preventative against and destroys insects.

Example 5

A wood preservative was made with the following composition:

Pentachlorophenol	5.5%
O,O - diethyl - O - (α - cyanobenzylidene - amino) - thionophosphate ("Phoxim")	1.5%
2 - isoproxyphenyl - N - methyl carbamate	1.0%
N - dichlorofluoromethylthio - N',N' - dimethyl - aminosulphonanilide	0.5%
Aromatics, boiling range 187—213°C.	77.4%
Copolymer of vinyl chloride and vinyl isobutyl ether	6.0%
Masking perfume	0.1%
Methanol	2.0%
Montmorillonite	6.0%
	100.0%

It was possible to achieve a waterproofing effect (according to U.S. Standard TT-W-572) with a WR value of 90%.

The preservative has a preventive action against insects, fungi and beetles (also against termites), and also combats insects including termites.

Example 6

A wood preservative was made with the following composition:

N - dichlorofluoromethylthio - N',N' - dimethyl - aminosulphonanilide	0.6%
Tetrachlorophenol	5.5%
γ-hexachlorocyclohexane	0.8%
1,2,3,4,10,10 - hexachloro - 6—7-epoxy - 1,4,4a,5,6,7,8,8a - octahydro - 1,4,endo - 5,8 - exo-dimethano - naphthalene ("dieldrin")	0.7%
Aromatics boiling range 180°—210°C.	76.4%
Phenol resin	7.0%
Swelling clay	3.5%
Colloidal silica	3.5%
Isopropanol	2.0%
	100.0%

It was possible to achieve a waterproofing effect (according to U.S. Standard TT-W-572) with a WR value of 90%.

The preservative has a preventive action against insects, fungi and beetles including termites, and also combats insects including termites.

Example 7

A wood preservative was made with the following composition:

Pentachlorophenol and tetrachlorophenol (approx. 1:1)	5.5%
γ-hexachlorocyclohexane	0.5%
N - dichlorofluoromethylthio - N',N' - dimethyl - aminosulphonanilide	0.5%
Alkyd resin (100% reckoned as the solvent-free resin)	12.0%
White spirit, boiling range 145—210°C.	50.2%
Aromatics, boiling range 153—213°C.	20.0%
Montmorillonite	6.0%
Siccative and odour correctors	0.3%
Methanol	2.0%
Pigment paste	3.0%
	100.0%

It was possible to achieve a waterproofing effect (according to U.S. Standard TT-W-572) with a WR value of 98%.

The preservative has a preventive action against fungi, beetles and insects.

WHAT WE CLAIM IS:—

1. A preservative for wood or wood-based material, comprising over 50% by weight of a base, all or a major proportion of which is an organic, oily solvent, or mixture of solvents, of low volatility having an evaporation number exceeding 35 as determined in accordance with DIN 53170 and a flash point above 30°C., from 3 to 15% by weight of one or more binders (reckoned on solid material) dispersible or soluble in said base, from 0.3 to 7% by weight of one or more insecticides soluble in said base and/or in said binder(s), from 0.5 to 10% by weight of one or more fungicides soluble in said base and/or in said binder(s), and from 3 to 10% by weight of at least one organic or finely-divided inorganic swelling agent, the proportion by weight of binder(s) to swelling agent(s) being from 4:1 to 1:3.3.

2. A preservative as claimed in Claim 1, wherein the preservative comprises at least 72% by weight of said base.

3. A preservative as claimed in Claim 1 or 2, wherein the preservative comprises 1 to 7% by weight of fungicide(s).

4. A preservative as claimed in any one of claims 1 to 3, wherein the preservative comprises 0.5 to 4% by weight of insecticide(s).

5. A preservative as claimed in any one of claims 1 to 4, wherein the preservative comprises from 4 to 10% by weight of said binder(s).

6. A preservative as claimed in any one of claims 1 to 5, wherein the preservative comprises from 4 to 7% by weight of said swelling agent(s).

7. A preservative as claimed in any one of Claims 1 to 6, wherein the proportion by weight of binder(s) to swelling agent(s) is from 2:1 to 1:1.3.

8. A preservative as claimed in any one of Claims 1 to 7, wherein the binder is a linseed oil varnish and/or a resin soluble in the oily solvent(s).

9. A preservative as claimed in any one of Claims 1 to 8, wherein the binder is an alkyd resin, a polyacrylate ester, polypropylene chloride, a copolymer of vinyl chloride and/or a hydrocarbon, or a mixture of two or more thereof.

10. A preservative as claimed in any one of Claims 1 to 9, wherein the proportion by weight of the solvent(s) to the swelling agent(s) is from 10:1 to 25:1.

11. A preservative as claimed in any one of Claims 1 to 10, wherein the proportion by weight of the solvents to the swelling agent(s) is from 13:1 to 20:1.

12. A preservative as claimed in any one of Claims 1 to 11, wherein from 0.1 to 7% by weight of said base comprises a readily volatile or medium volatile organic liquid soluble in said oily solvent(s), and/or one or more plasticisers or fixers soluble in said oily solvent(s), the resulting mixture having an evaporation number exceeding 35 as determined in accordance with DIN 53170 and a flash point above 30°C.

13. A preservative as claimed in Claim 12, wherein the readily volatile or medium volatile organic liquid is a hydrophilic solvent.

14. A preservative as claimed in Claim 13, wherein said hydrophilic solvent is a monohydric or polyhydric alcohol with 1 to 7 carbon atoms, an ether, an ester, a ketone or a mixture of two or more thereof.

15. A preservative as claimed in any one of Claims 1 to 14, wherein the swelling agent is a swelling clay, a montmorillonite, a silica gel, aluminium stearate, calcium stearate, hardened castor oil or a mixture of two or more thereof.

16. A preservative as claimed in any one of Claims 1 to 15, wherein the preservative has a viscosity of 300 to 4,000 cP. (measured at 20°C.).

17. A preservative as claimed in any one of Claims 1 to 16, wherein the preservative has a viscosity of 1,500 to 3,000 cP. (measured at 20°C.).

18. A preservative for wood or wood-based material substantially as hereinbefore described in any one of the foregoing Examples.

19. A method of making the preservative for wood or wood-based material claimed in any preceding claim, wherein the binder(s) in an amount of from 3 to 15% by weight and the swelling agent(s) in an amount of from 3 to 10% by weight are incorporated with the remaining ingredients so as to provide the preservative with a viscosity of 300 to 4,000 cP. (measured at 20°C.).

20. A method as claimed in Claim 19, wherein the method is carried out at a temperature of from 10 to 65°C.

21. A method as claimed in Claim 19 or 20, wherein the method is carried out at a temperature of from 30 to 55°C.

22. A method as claimed in any one of Claims 19 to 21, wherein the swelling agent(s)

is(are) stirred into the oily solvent(s), whereafter the fungicide(s) and insecticide(s) are added, then the binder(s) and finally any necessary siccative(s) or other ingredients.

23. A method as claimed in any one of Claims 19 to 22, wherein a hydrophilic solvent is added to the oily solvent(s), before, during or after the addition of the swelling agent(s).

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