



EUROPEAN PATENT APPLICATION

Application number : **91830209.2**

Int. Cl.⁵ : **B27K 3/46, C10C 1/08**

Date of filing : **20.05.91**

Priority : **26.06.90 IT 1794690**

Date of publication of application :
08.01.92 Bulletin 92/02

Designated Contracting States :
AT BE CH DE DK ES FR GB LI SE

Applicant : **MARGARITELLI - S.P.A.**
Via Adriatica, 109
I-06087 Ponte San Giovanni (PG) (IT)

Inventor : **Margaritelli, Giuseppe**
Via IV Novembre, 46
I-05010 San Venanzo (TR) (IT)

Representative : **Baldi, Claudio**
Piazza Ghislieri, 3
I-60035 Jesi (Ancona) (IT)

Distilled, fractional and rectified coal tar oil for ecologically impregnating wood.

The present invention regards a distilled, fractional and rectified coal tar oil for the ecological impregnation of wood characterized by the fact that it is the product of column rectification of naphthalene oil carried out at a temperature ranging from between 230°C and 330°C.

The object of the present patent application for industrial use is a distilled, fractional and rectified coal tar oil to be used for ecologically impregnating wood.

As is well known in order to lengthen the life of construction wood it is necessary to protect it from being attacked by fungus and insects, particularly when it is used for external work where it is more subject to climatic changes or may be in contact with the ground or immersed in water.

The antiseptic treatment which is at present used on wood to avoid deterioration is based on mineral salts (arsenic, chrome, copper and boron dissolved in water) or on creosote (distilled coal tar oil from pit-coal).

The choice between one or the other of the solutions depends on various factors such as the anti-fungus capacity, the resistance to washings, the electric insulation, the degree of penetration into the wood, inflammability; nowadays however it is the ecological factor which must be taken into consideration above all others, in the sense of favouring the type of treatment and the relative substances used which are less polluting for the environment.

The type of treatment most used is the one with a creosote base; the type of treatment often used for electric current, telegraph and telephone poles, railway sleepers and superstructures, mooring and warning dolphins, spiles, planks and beams which are to be used in contact with the ground or immersed in fresh or salt water.

Treatment with creosote has proved to be particularly effective even with wood to be used in agriculture or in constructing gang planks, avalanche protections, river embankments and in all those situations where the long life of the wood being used must be guaranteed.

At present this wood treatment process using creosote involves the introduction of the wood to be treated into an autoclave where the wood is impregnated with the aforesaid oil, each time respecting the temperature and pressure levels and permanence according to the functions of the various qualities of wood to be worked.

It is to be pointed out that this treatment entails a final phase where a depression in the autoclave is created so as to favour the discharge of the same oil from the wood fibre which had previously been forced into it under pressure. Despite its appreciable functional results, creosote has recently come under discussion because of its toxic and polluting characteristics due to its high content of some aromatic polycyclic hydrocarbons (APH) to which - if certain safety values are not kept to - cancerogenous properties have been attributed.

Besides this, it must be said that creosote produces vapours which give off an intense and annoying odour which is often associated with a bad impression of the environment and for man.

In consideration of this inconvenience of creosote a mineral oil has been attempted which, although coming from the distillation of pit-coal, has been structurally modified both as regards the distillation curve and the phenol and aromatic polycyclic hydrocarbons content; this in order to obtain an oil capable of boasting functional properties in keeping with those of the creosote at present available and used, but above all of being without those polluting capacities which creosote is nowadays accused of having.

This last result in particular was achieved by using the invention to eliminate from the oil a part of the undesirable aromatic polycyclic hydrocarbons, which are present only in negligible amounts, to a percentage value which is much less than the minimum permissible by law.

In order to clarify the specific procedure for the realisation of this oil according to the invention it should be pointed out above all that three types of distilled oil are obtained from the batch distillation of pit-coal: indene oil (the light one), naphthalene oil (the medium one) and anthracene oil (the heaviest one).

So, whereas creosote is obtained starting from anthracene oil, the new coal tar oil is obtained from the column rectification of naphthalene oil, which is injected under continuous feed into a rectification plant made up of three columns in series where it undergoes further fractioning in a more decisive way using different cuts having relatively brief distillation intervals.

In fact the oil in question begins to distill at about 230°C; at 330°C at least 97% of the oil itself has been distilled.

Should it be necessary it is possible to have a different cut by enriching or weakening the distillate of its stronger or weaker components.

The new oil obtained as indicated above has the following characteristics:

APPEARANCE	: liquid, limpid, free of emulsions and deposits;
SMELL	: typical
WATER %	: traces
DENSITY at 30°C	: 1050 gr/l

We feel it would be of interest also to give the values of the distillation curve:

	230xC	distillation begins	
	250xC	0.5% of distillate	
5	260xC	27%	"
	270xC	57%	"
	280xC	71%	"
10	290xC	81%	"
	300xC	87%	"
	310xC	93%	"
15	320xC	95%	"
	330xC	97%	"
20	Phenic acids	0.80%	
	Quinoline bases	7.50%	

As already mentioned the oil obtained in this way has a Benzo (α) Pyrene content which is less than the detectable limit of the instrument for the same set at 2 ppm; however in the industrial production process of the oil in question it might be difficult to maintain the concentration of Benzo (α) Pyrene within the above limit therefore it would be more realistic to consider the limit of oscillation of this value up to a maximum of 20 ppm.

It should be remembered that the Benzo (α) Pyrene content is considered as the reference value for evaluating the amount of cancerogenous aromatic polycyclic hydrocarbons in pyrolysis products of organic matter; in other words, when the value of Benzo (α) Pyrene is at a negligible level we can be certain that also the other aromatic polycyclic hydrocarbons, those bearing a risk of cancer, are either absent or are present in insignificant quantities.

The oil according to the invention has also numerous other practical advantages over conventional creosote: above all it enables the impregnation temperature of wood to be lowered quite noticeably from 90xC (at present necessary when using creosote) to 35xC.

This results on one hand in obtaining a large reduction in the formation of condensate during the final depression stage carried out in the autoclave, and on the other in eliminating the presence of toxic mineral oil fumes when the door of the autoclave is opened.

It can be easily understood that under these conditions the high possibility of risk of pollution in the work environment and externally are noticeably reduced.

It should also be pointed out that the new product in question, being much more fluid than the old one, guarantees greater penetration capacity not only in correspondence with the alburnum part of wood but also with the heart wood; thanks to its high fluidity the oil in question can be used to great advantage also in the case where it is necessary to practice a second impregnation on material already treated with other antiseptic solutions, in particular mineral salts.

Furthermore for the same reason the new oil also means that the treated wood will come out of the autoclave completely dry, thanks to the greater ease with which the depression created inside the autoclave succeeds in causing the extraction of the oil itself from the wood fibre.

In this way the risk of oil dripping out of the wood taken out of the autoclave is annulled, with consequent elimination of the danger of polluting the ground or water wherever the wood is placed.

In comparison to the old oil, the oil in question is worthy of note for the fact that it facilitates the greater volatilization of its lighter fractions within the autoclave thus reducing the possibility of volatilization outside.

The use of low running temperatures consequently allows additives to be used on this new product which further reduce the giving off of bad smells. Examples of such additives are complex mixtures of fragrant substances of a natural or synthetic origin, usually available on the market and which are characterized by their strong covering power. Lastly it should be pointed out that this new oil also distinguishes itself for the fact that it does not alter the external appearance of the treated wood, on the contrary it heightens the grain which is the opposite of what happens when conventional creosote is used because its high content of pitch makes the

surfaces of the impregnated wood completely black.

Claims

5

1) Distilled fractional and rectified coal tar oil for the ecological impregnation of wood characterized by the fact that it is the product of column rectification of naphthalene oil carried out at a temperature ranging from between 230°C and 330°C.

10

2) Distilled fractional and rectified coal tar oil for the ecological impregnation of wood, according to claim 1, characterized by the fact that additives of a complex natural and synthetic nature having a strong covering capacity can be added which are capable of reducing the emanation of bad smells from the oil itself.

15

20

25

30

35

40

45

50

55



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 83 0209

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	SOVIET INVENTIONS ILLUSTRATED, section Ch: Chemical, week E43, 8th December 1982, page 2, accession no. 92223 E/43, Derwent Publications Ltd, London, GB; & SU-A-891 747 (UKR COAL CHEM. INST.) 23-12-1981 ---	1	B 27 K 3/46 C 10 C 1/08
A	PATENT ABSTRACTS OF JAPAN, vol. 8, no. 218 (C-245)[1655], 4th October 1984; & JP-A-59 101 401 (OSAKA GAS K.K.) 12-06-1984 ---	1,2	
A	US-A-4 670 992 (R.E. LEONARD) * Claims *	1	
A	DE-A-3 811 199 (MC-BAUCHEMIE MÜLLER) * The whole document *	1,2	
A	EP-A-0 359 935 (VERKAUFSGESELLSCHAFT FÜR TEERERZEUGNISSE) * Page 1, lines 2-43; claims * -----	1,2	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 27 K C 10 C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 02-10-1991	Examiner FLETCHER A.S.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 01.82 (P0401)