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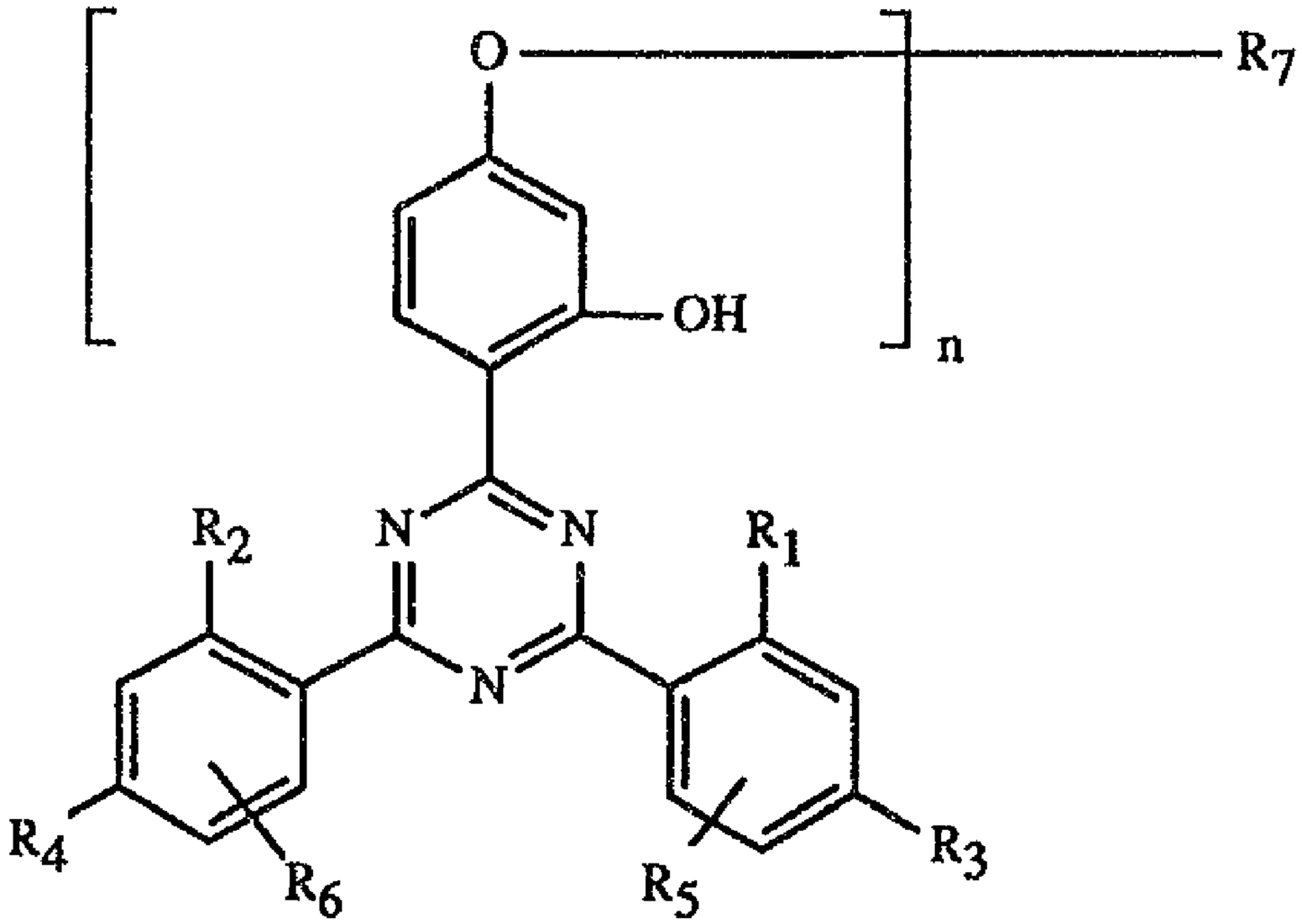
(54) Titre : COMPOSITIONS DE REVETEMENT STABILISEES A LA LUMIERE, A LA CHALEUR ET A L'OXYGENE
(54) Title: COATING COMPOSITIONS STABILISED AGAINST LIGHT, HEAT AND OXYGEN



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(57) Abrégé/Abstract:
o-Hydroxyphenyl-s-triazines of formula I (see formula I) wherein n is 1 or 2 and R_1 to R_7 are as defined in claim 7, are good light stabilisers for coating compositions which contain a basic curing catalyst. In contradistinction to other UV absorbers, they do not cause discolourations in the presence of such catalysts.

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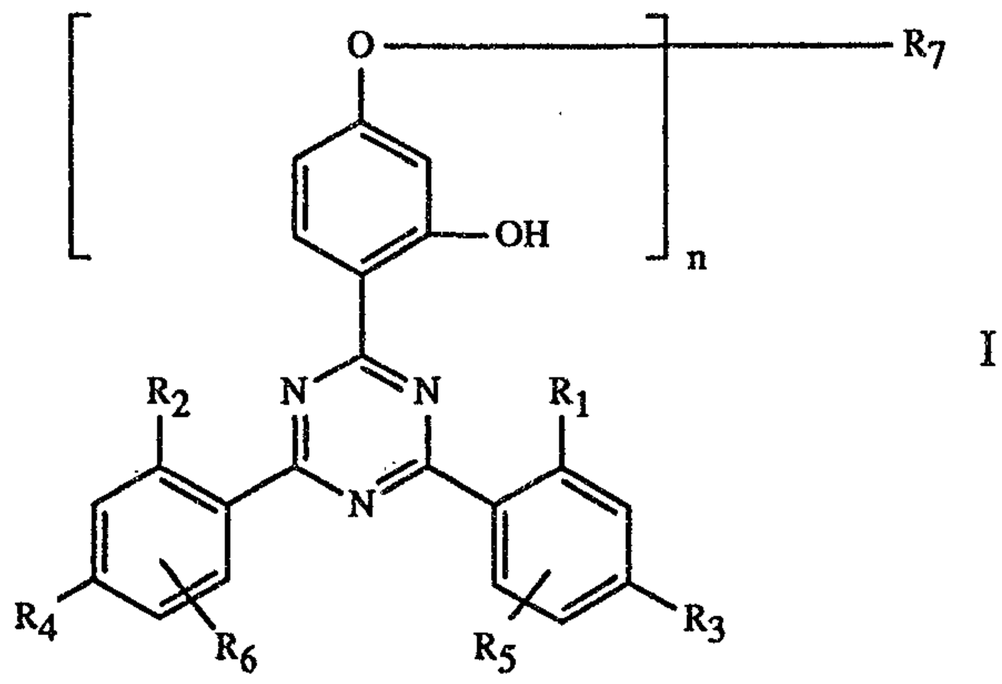
A-17964/1+2/+

Coating compositions stabilised against light, heat and oxygen

Abstract of the Disclosure

o-Hydroxyphenyl-s-triazines of formula I



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wherein n is 1 or 2 and R_1 to R_7 are as defined in claim 7, are good light stabilisers for coating compositions which contain a basic curing catalyst. In contradistinction to other UV absorbers, they do not cause discolourations in the presence of such catalysts.

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Coating compositions stabilised against light, heat and oxygen

The present invention relates to coating compositions which are stabilised against light, heat and oxygen and which contain an o-hydroxyphenyl-s-triazine derivative as stabiliser. The coating compositions to be stabilised are those which contain as curing catalyst an organometallic compound, an amine, an amino group containing resin or a phosphine.

The thermal curing of stoving varnishes which contain certain types of binders can be accelerated by catalysts, thereby making possible shorter curing times or lower curing temperatures. Depending on the type of binder, the catalysts may be acids or bases. Basic catalysts comprise organic metallic compounds such as metal chelates, metal carbonates or organometallic compounds or also amines.

If it is desired to enhance the light stability of a coating, a light stabiliser, preferably a UV absorber, will normally be added. The most widely used types of UV absorbers for coating compositions are the 2-hydroxybenzophenones and 2-(2-hydroxyphenyl)benzotriazoles. The addition of such UV absorbers to a coating composition which contains an organic metallic compound, an amine or a phosphine as curing agent, gives rise to discolourations which are evidently formed by reaction of the light stabiliser with the curing catalyst. A further deleterious effect which may be caused by the UV absorber is that the curing catalyst is blocked, so that the coating is insufficiently cured. It is probable that the aromatic hydroxyl groups of the UV absorber cause chelation of the base.

In the course of seeking UV absorbers which do not give rise to troublesome effects in such catalysed coating compositions it is now been found that certain derivatives of 2-hydroxyphenyl-s-triazine do not have the drawbacks referred to above of the other UV absorbers, although they too are good UV absorbers and although they also contain phenolic hydroxyl groups which are capable of effecting chelation.

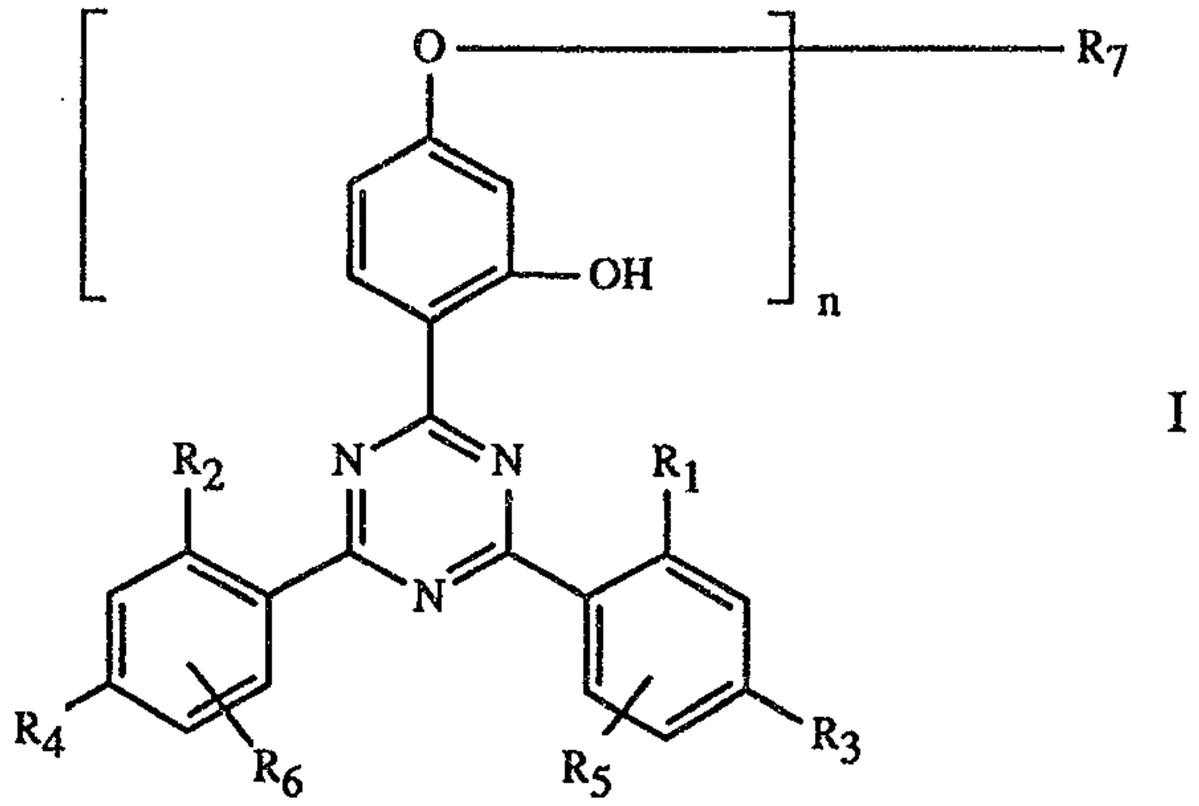
Specifically, the present invention relates to a coating composition comprising

A) a binder,

B) as curing catalyst, an organic metallic compound and/or an amine and/or an amino

group containing resin and/or a phosphine, and

C) as stabiliser against damage induced by light, heat and oxygen, a compound of formula I



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wherein n is 1 or 2,

R_1 and R_2 are each independently of the other H, OH, C_1-C_{12}alkyl or halomethyl,

R_3 and R_4 are each independently of the other H, OH, C_1-C_{12}alkyl, C_1-C_{18}alkoxy or halogen and, when n = 1, may also be a radical -OR_7,

R_5 and R_6 are each independently of the other H, C_1-C_{12}alkyl or halogen,

R_7, when n is 1, is hydrogen, C_1-C_{18}alkyl or C_1-C_{12}alkyl, each substituted by OH, C_1-C_{18}alkoxy, halogen, phenoxy or phenoxy which is substituted by C_1-C_{18}alkyl, C_1-C_{18}alkoxy or halogen, -COOH, -$COOR_8$, -$CONH_2$, -$CONHR_9$, -$CON(R_9)(R_{10})$, -NH_2, -NHR_9, -$N(R_9)(R_{10})$, -$NHCOR_{11}$, -CN and/or -$OCOR_{11}$, or R_7 is C_4-C_{20}alkyl which is interrupted by one or more oxygen atoms and substituted by OH or C_1-C_{12}alkoxy, or is C_3-C_6alkenyl, glycidyl, C_5-C_8cycloalkyl, cyclohexyl which is substituted by OH, C_1-C_4alkyl or -$OCOR_{11}$, C_7-C_{11}phenylalkyl which is unsubstituted or substituted by OH, Cl or CH_3, or is -CO-R_{12} or -SO_2-R_{13}, and, when n is 2, is C_2-C_{16}alkylene, C_4-C_{12}alkenylene, xylylene, C_3-C_{20}alkylene which is interrupted by one or more oxygen atoms and/or substituted by OH, or is a -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-, -CO-R_{16}-CO-, -CO-NH-R_{17}-NH-CO- or -$(CH_2)_m$-COO-R_{18}-OCO-$(CH_2)_m$- group, wherein m is 1-3,

R_8 is C_1-C_{18}alkyl, C_3-C_{18}alkenyl, C_3-C_{20}alkyl which is interrupted by O, N or S and/or substituted by OH, C_1-C_4alkyl which is substituted by -$P(O)(OR_{14})_2$, -$N(R_9)(R_{10})$ or -$OCOR_{11}$ and/or OH, or is glycidyl, cyclohexyl or C_7-C_{11}phenylalkyl,

R_9 and R_{10} are each independently of the other C_1-C_{12}alkyl, C_3-C_{12}alkoxyalkyl,

C_4-C_{16}dialkylaminoalkyl or C_5-C_{12}cycloalkyl, or

R_9 and R_{10}, when taken together, are C_3-C_9alkylene or C_3-C_9oxaalkylene or C_3-C_9azaalkylene,

R_{11} is C_1-C_{18}alkyl, C_2-C_{18}alkenyl or phenyl,

R_{12} is C_1-C_{18}alkyl, C_2-C_{18}alkenyl, phenyl, C_1-C_{12}alkoxy, phenoxy, C_1-C_{12}alkylamino, phenylamino, tolylamino or naphthylamino,

R_{13} is C_1-C_{12}alkyl, phenyl, naphthyl or C_7-C_{14}alkylphenyl,

R_{14} is C_1-C_{12}alkyl or phenyl,

R_{15} is C_2-C_{10}alkylene, phenylene or a phenylene-X-phenylene- group, wherein X is -O-, -S-, -SO_2-, -CH_2- or -$C(CH_3)_2$-,

R_{16} is C_2-C_{10}alkylene, C_2-C_{10}oxaalkylene or C_2-C_{10}thiaalkylene, phenylene, naphthylene, diphenylene or C_2-C_6alkenylene,

R_{17} is C_2-C_{10}alkylene, phenylene, naphthylene, methylenediphenylene or C_7-C_{15}alkylphenylene, and

R_{18} is C_2-C_{10}alkylene or C_4-C_{20}alkylene which is interrupted by oxygen.

The binder may be any resin or mixture of resins which can be cured by organometallic compounds or amines.

Exemplary of such binders which can be base-catalysed are:

1. acrylate copolymers containing alkoxysilane or alkoxysiloxane side groups, for example the polymers disclosed in US-A-4 772 672 or US-A-4 444 974,

2. two component systems based on hydroxyl group containing polyacrylates and/or polyesters and aliphatic or aromatic polyisocyanates,

3. two component systems based on functional polyacrylates and a polyepoxide, said polyacrylate containing carboxyl, anhydride or amino groups,

4. two component systems based on fluoro-modified or silicon-modified hydroxyl group containing polyacrylates or polyesters and aliphatic or aromatic polyisocyanates,

5. two component systems based on (poly)ketimines and aliphatic or aromatic polyisocyanates,

6. two component systems based on (poly)ketimines and unsaturated acrylate resins or acetoacetate resins or methyl-α-acrylamidomethyl glycolate,

7. two component systems based on anhydride group containing polyacrylates and polyamines,

8. two component systems based on (poly)oxazolidines and anhydride group containing polyacrylates or unsaturated acrylate resins or polyisocyanates,

9. two component systems based on epoxy group containing polyacrylates and carboxyl group containing or amino group containing polyacrylates,

10. air-drying alkyd, acrylic or alkyd-acrylic resins,

11. polymers based on allylglycidyl ether.

Component A is preferably a binder based on a functional acrylate resin and a crosslinker.

Component B is an organic metallic compound and/or an amine and/or an amino group containing resin and/or a phosphine. Exemplary of organic metallic compounds are metal carboxylates, preferably of the metals Pb, Mn, Co, Zn, Zr or Cu, or metal chelates, preferably those of the metals Al, Ti or Zr, or organometallic compounds such as organotin compounds.

Metal carboxylates are typically the stearates of Pb, Mn or Zn, the octoates of Zn or Cu, the naphthenates of Mn and Co, or the corresponding linoleates, resinates or tallates.

Metal chelates are typically the aluminium, titanium or zirconium chelates of acetyl-acetone, ethyl acetylacetate, salicylaldehyde, salicylaldoxime, o-hydroxyacetophenone or ethyl trifluoroacetylacetate and the alkoxides of these metals.

Organotin compounds are typically dibutyltin oxide, dibutyltin dilaurate or dibutyltin dioctoate.

Amines are, typically, preferably tertiary amines, such as tributylamine, triethanolamine,

N-methyl-diethanolamine, N-dimethylethanolamine, N-ethylmorpholine, N-methylmorpholine or diazabicyclooctane (triethylenediamine) and the salts thereof. Further examples are quaternary ammonium salts such as trimethylbenzylammonium chloride.

Amino group containing resins are simultaneously binder and curing catalyst. Typical examples are acrylate copolymers.

Phosphines may also be used as curing catalysts, for example triphenylphosphine.

The o-hydroxyphenyl-s-triazines of component C are known compounds or are disclosed in U.S. Patent No. 5,736,597. The use of such compounds as UV absorbers in coating compositions is disclosed, for example, in US-A-4 619 956.

It is preferred to use as component C a compound of formula I, wherein n is 1 or 2,
R_1 and R_2 are each independently of the other H, OH or C_1-C_4alkyl,
R_3 and R_4 are each independently of the other H, OH, C_1-C_4alkyl, C_1-C_4alkoxy, halogen or a radical -OR_7,
R_5 and R_6 are each independently of the other H or C_1-C_4alkyl,
R_7, when n is 1, is hydrogen, C_1-C_{18}alkyl, C_1-C_6alkyl which is substituted by OH, C_1-C_{18}alkoxy, phenoxy, -$COOR_8$, -$CONHR_9$, -$CON(R_9)(R_{10})$ and/or -$OCOR_{11}$, or is allyl, glycidyl or benzyl, and, when n is 2, is C_4-C_{12}alkylene, C_4-C_6alkenylene, xylylene or C_3-C_{20}alkylene which is interrupted by oxygen and/or substituted by OH,
R_8 is C_1-C_{12}alkyl, C_3-C_{18}alkenyl, C_3-C_{20}alkyl which is interrupted by oxygen and/or substituted by OH, or C_1-C_4alkyl which is substituted by -$P(O)(OR_{14})_2$,
R_9 and R_{10} are each independently of the other C_1-C_8alkyl or cyclohexyl, or R_9 and R_{10}, when taken together, are pentamethylene or 3-oxapentamethylene,
R_{11} is C_1-C_8alkyl, C_2-C_5alkenyl or phenyl, and
R_{14} is C_1-C_4alkyl.

It is especially preferred to use as component C a compound of formula I, wherein n is 1 or 2,
R_1 and R_2 are each independently of the other H or CH_3,
R_3 and R_4 are each independently of the other H, CH_3 or Cl,
R_5 and R_6 are hydrogen,
R_7, when n is 1, is hydrogen, C_1-C_{12}alkyl, C_1-C_4alkyl which is substituted by OH,

C_4-C_{18}alkoxy, -$COOR_8$, -$CON(R_9)(R_{10})$ and/or -$OCOR_{11}$, or is glycidyl or benzyl, and, when n is 2, is C_6-C_{12}alkylene, 2-butenyl-1,4-ene, xylylene or C_3-C_{20}alkylene which is interrupted by oxygen and/or substituted by OH,

R_8 is C_4-C_{12}alkyl, C_{12}-C_{18}alkenyl, C_6-C_{20}alkyl which is interrupted by oxygen and/or substituted by OH, or is C_1-C_4alkyl which is substituted by -$P(O)(OR_{14})_2$,

R_9 and R_{10} are C_4-C_8alkyl,

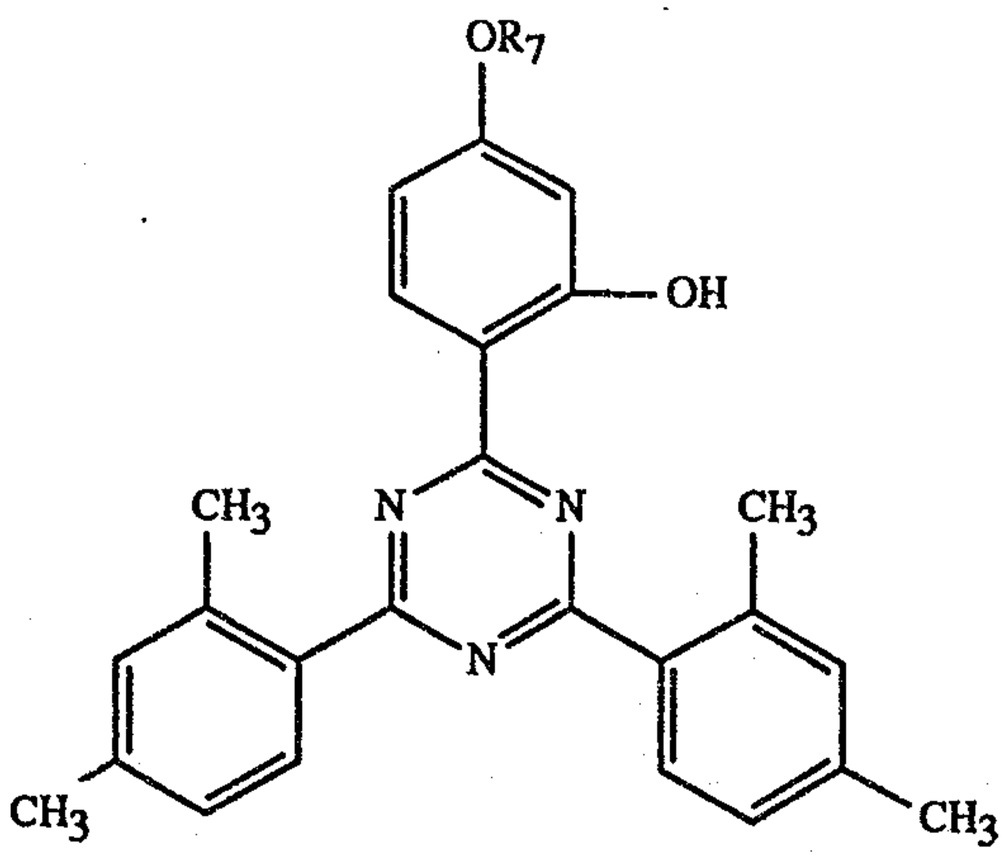
R_{11} is C_1-C_8alkyl or C_2-C_3alkenyl, and

R_{14} is C_1-C_4alkyl.

A further group of compounds suitable for use as component C comprises those compounds wherein n is 1 or 2 and R_7, when n is 1, is a -$CH_2CH(OH)CH_2O$-R_{19} group, wherein R_{19} is C_1-C_{12}alkyl, phenyl, phenyl which is substituted by C_1-C_{12}alkyl, C_1-C_{12}alkoxy or halogen, or is C_3-C_5alkenoyl

and, when n is 2, R_7 is a -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$- group, wherein R_{15} is C_2-C_{10}alkylene, phenylene or a -phenylene-X-phenylene- group, wherein X is -O-, -S-, -SO_2-, -CH_2- or $C(CH_3)_2$-.

Representative examples of individual compounds of formula I are the following compounds



R_7 = -H

-C_2H_5

-C_4H_9

-C_8H_{17}

$-C_{12}H_{25}$

$-C_{18}H_{37}$

-cyclohexyl

$-CH_2$ phenyl

$-CH_2CH_2OH$

$-CH_2CH_2OCOCH_3$

$-CH_2CH_2OCOCH=CH_2$

$-CH_2CH(OH)C_8H_{17}$

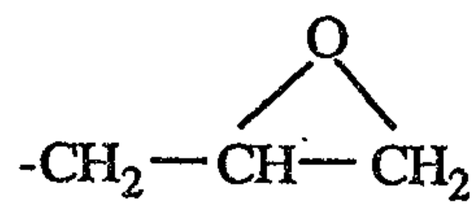
$-CH_2CH(OH)C_{12}H_{25}$

$-CH_2CH(OH)CH_2OC_8H_{17}$

$-CH_2CH(OH)CH_2O-(CH_2)_{\overline{12\text{-}14}}CH_3$

$-CH_2CH(OH)CH_2O$phenyl

$-CH_2CH(OH)CH_2OCOC(CH_3)=CH_2$



$-CH_2COOH$

$-CH_2CH_2COOC_4H_9$

$-CH_2COOC_8H_{17}$

$-CH_2COO(CH_2CH_2O)_7H$

$-CH_2COOCH_2CH(OH)CH_2OC_4H_9$

$-CH_2COOCH_2CH(CH_3)OCH_2CH(CH_3)OCH(CH_3)CH_3$

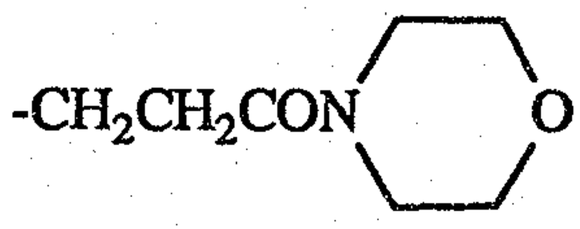
$-CH_2COOCH_2P(O)(OC_2H_5)_2$

$-CH_2COOCH_2CH(OH)CH_2P(O)(OC_4H_9)_2$

$-CH_2COO(CH_2)_7CH=CHC_8H_{17}$

$-CH_2COOCH_2CH_2OCH_2CH_2OC_6H_{13}$

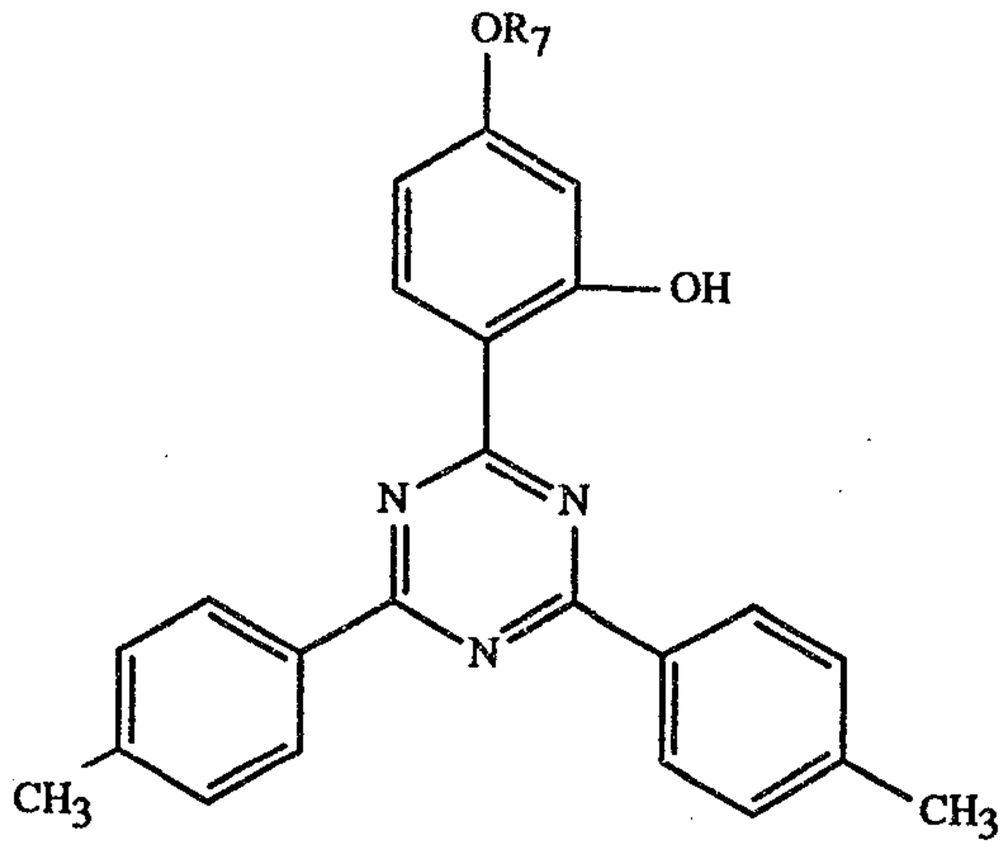
$-CH_2CON(C_2H_5)_2$



$-CH_2CONHCH_2CH_2CH_2N(CH_3)_2$

$-CH_2CONHC_8H_{17}$

$-CH_2CON(C_8H_{17})_2$



R_7 = $-C_4H_9$

$-C_8H_{17}$

$-C_{12}H_{25}$

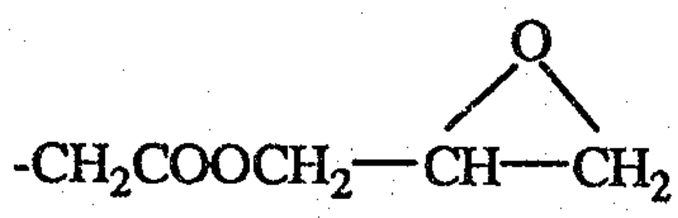
$-CH_2CH(OH)CH_2OC_8H_{17}$

$-CH_2CH(OH)CH_2O-(CH_2)_{\overline{12\text{-}14}}CH_3$

$-CH_2COOC_2H_5$

$-CH_2COOCH_2OCH_3$

$-CH_2COOCH_2CH{=}CH$-phenyl



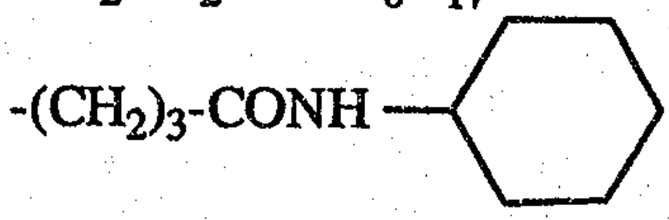
$-CH_2COOCH_2CH(OH)CH_2OC_8H_{17}$

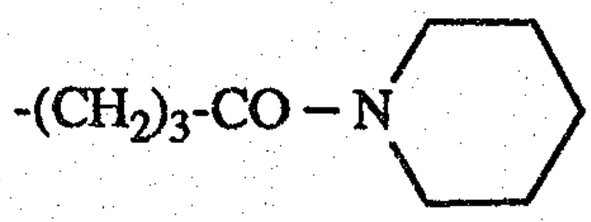
$-CH_2$phenyl

$-CH_2CH{=}CH_2$

$-CH_2CON(C_4H_9)_2$

$-CH_2CH_2CONH_8H_{17}$

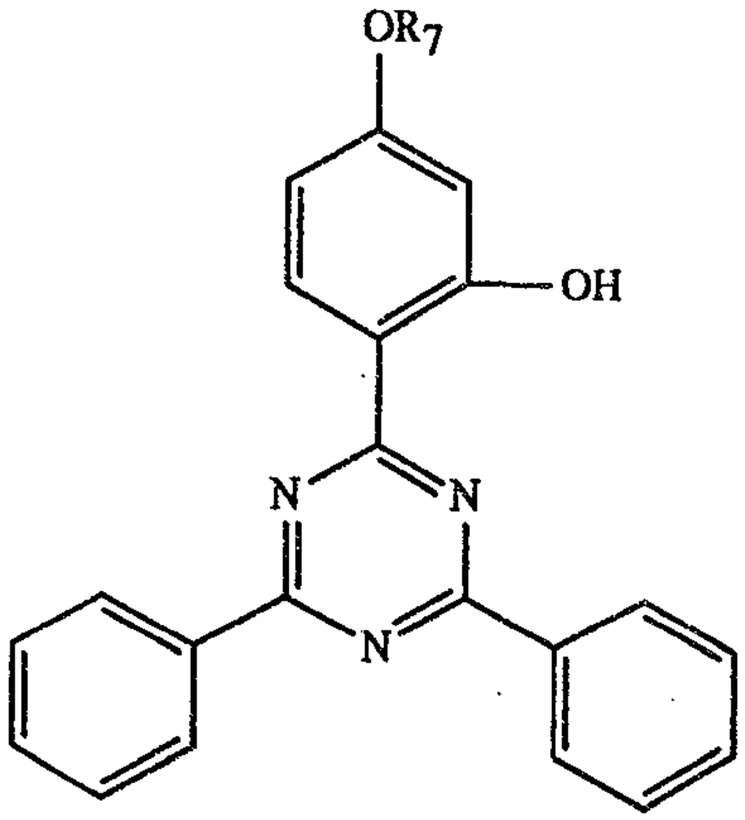




$-CO\text{-}OC_6H_{13}$

$-CH_2CH_2Cl$

$-CH_2CH_2CN$



R_7 = -H

$-CH_3$

$-C_3H_7$

$-C_6H_{13}$

$-C_8H_{17}$

$-C_{12}H_{25}$

$-CH_2CH(OH)CH_2OC_8H_{17}$

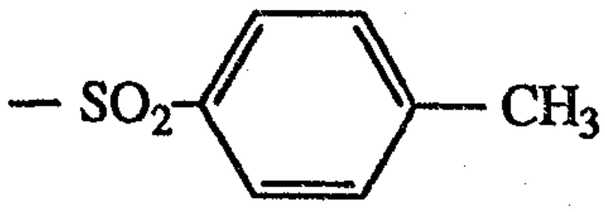
$-CH_2CH(OH)CH_2O-(CH_2)_{\overline{12\text{-}14}}CH_3$

$-CH_2CH(OH)$phenyl

$-CH_2CH(OH)CH_2OC$Ophenyl

$-CH_2CH(CH_3)OCOCH_3$

$-SO_2-C_{12}H_{15}$



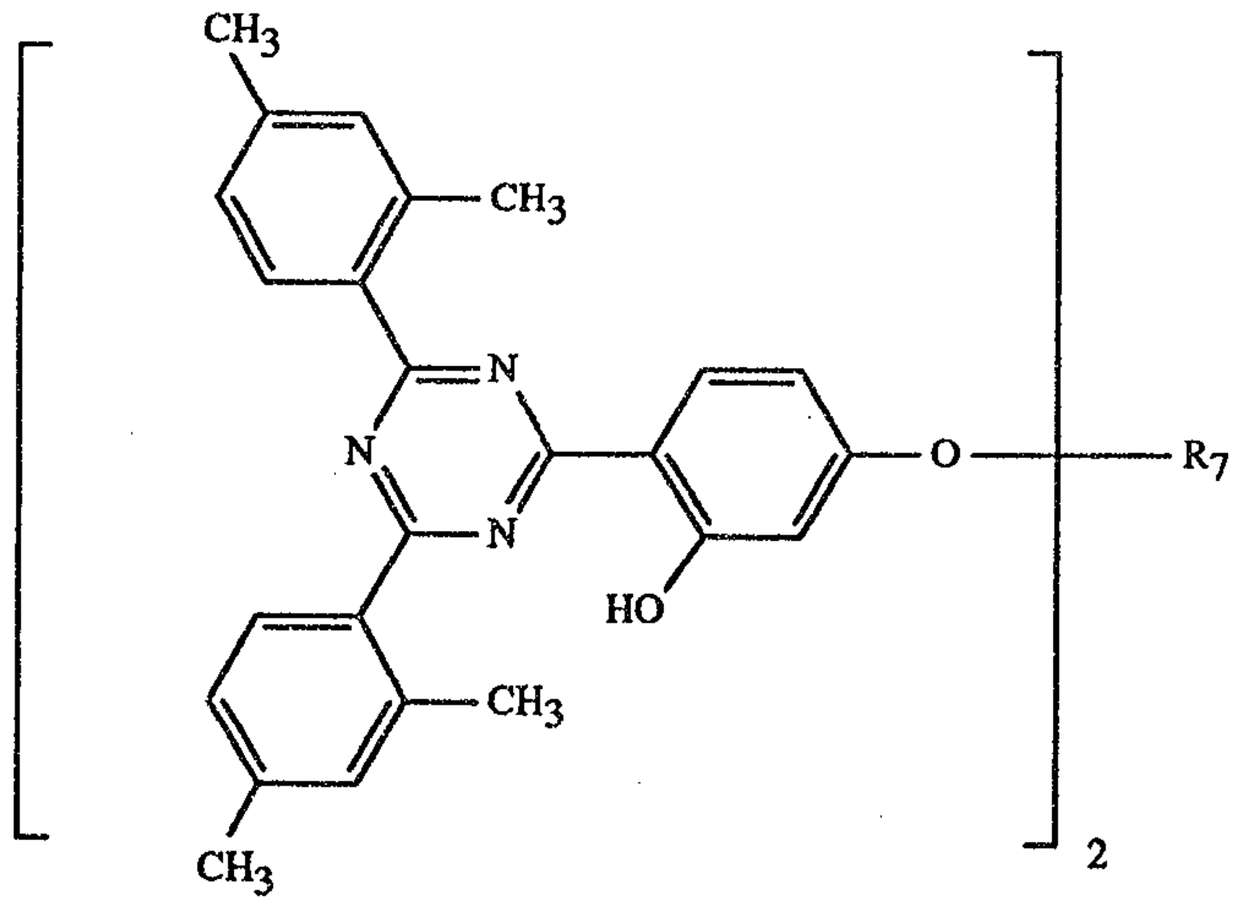
$-CH_2COOC_{10}H_{21}$

$-CH_2CONHCH_2CH_2OCH_3$

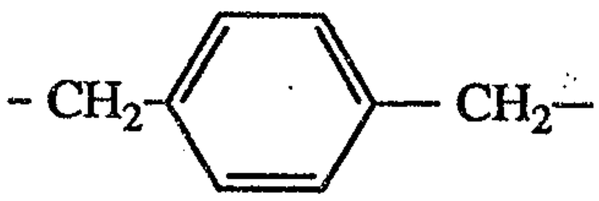
$-CH_2CH_2CONHCH_2$phenyl

$-(CH_2)_3CONH(CH_2)_3N(C_2H_5)_2$

$-CH_2CONHC_{12}H_{25}$



R_7 = $-CH_2CH(OH)CH_2-$



$-CH_2-CH=CH-CH_2-$

$-(CH_2)_4-$

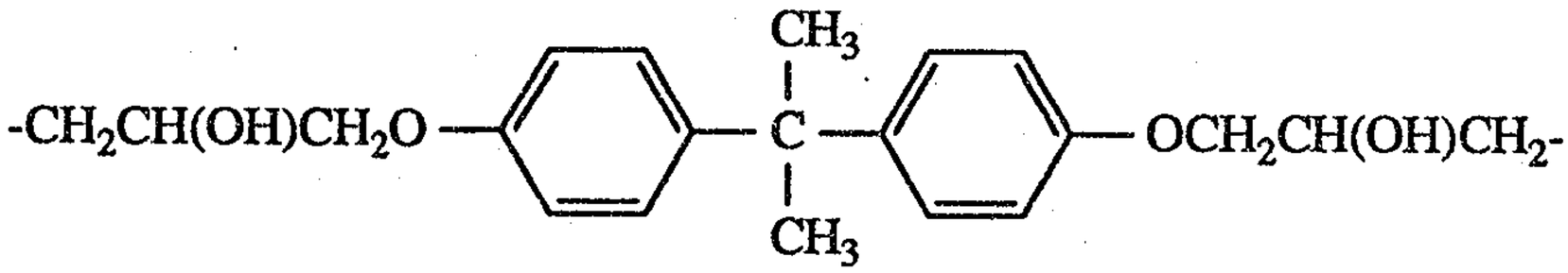
$-(CH_2)_6-$

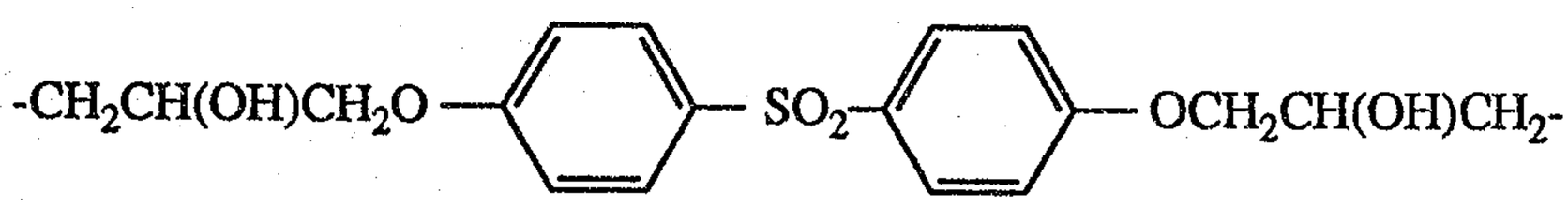
$-(CH_2)_8$

$-(CH_2)_{12}-$

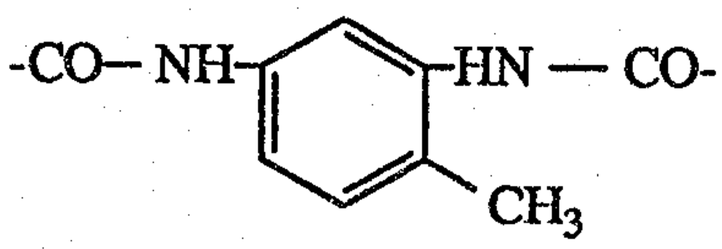
$-CH_2CH(OH)CH_2O-CH_2CH_2-OCH_2CH(OH)CH_2-$

$-CH_2CH(OH)CH_2O-(CH_2)_6-OCH_2CH(OH)CH_2-$

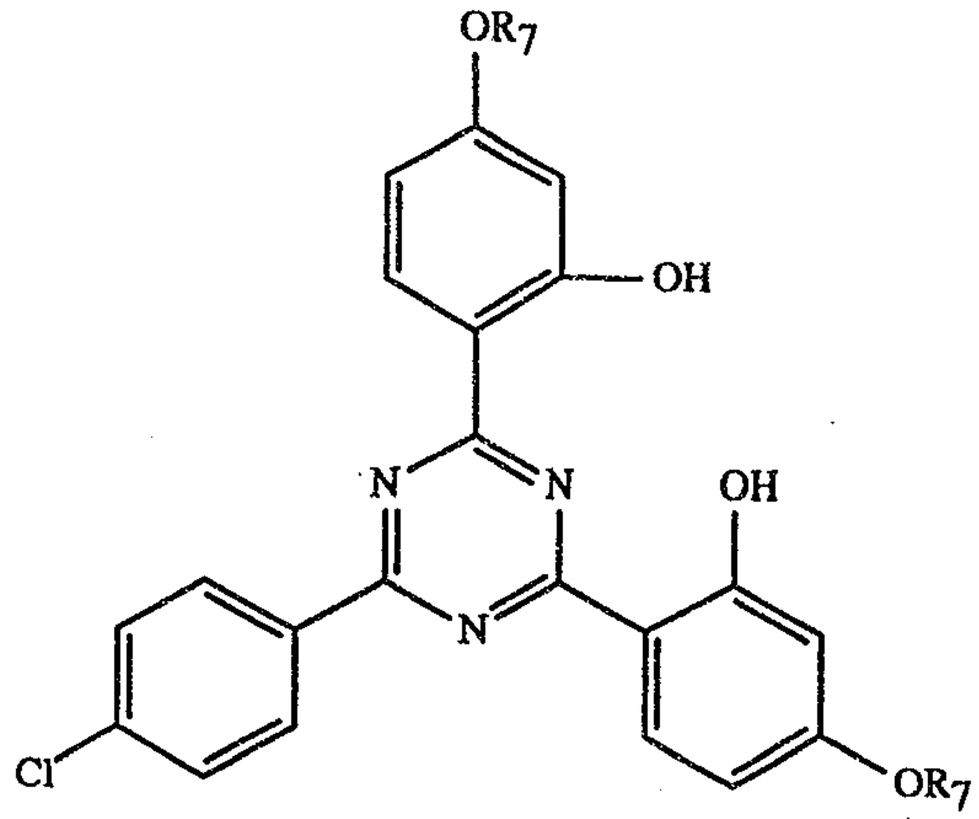




$-CH_2COO-(CH_2)_6-OCOCH_2$



$-CO-(CH_2)_8-CO-$



R_7 = -H

$-C_4H_9$

$-C_8H_{17}$

$-C_{18}H_{37}$

$-CH_2CH(OH)CH_3$

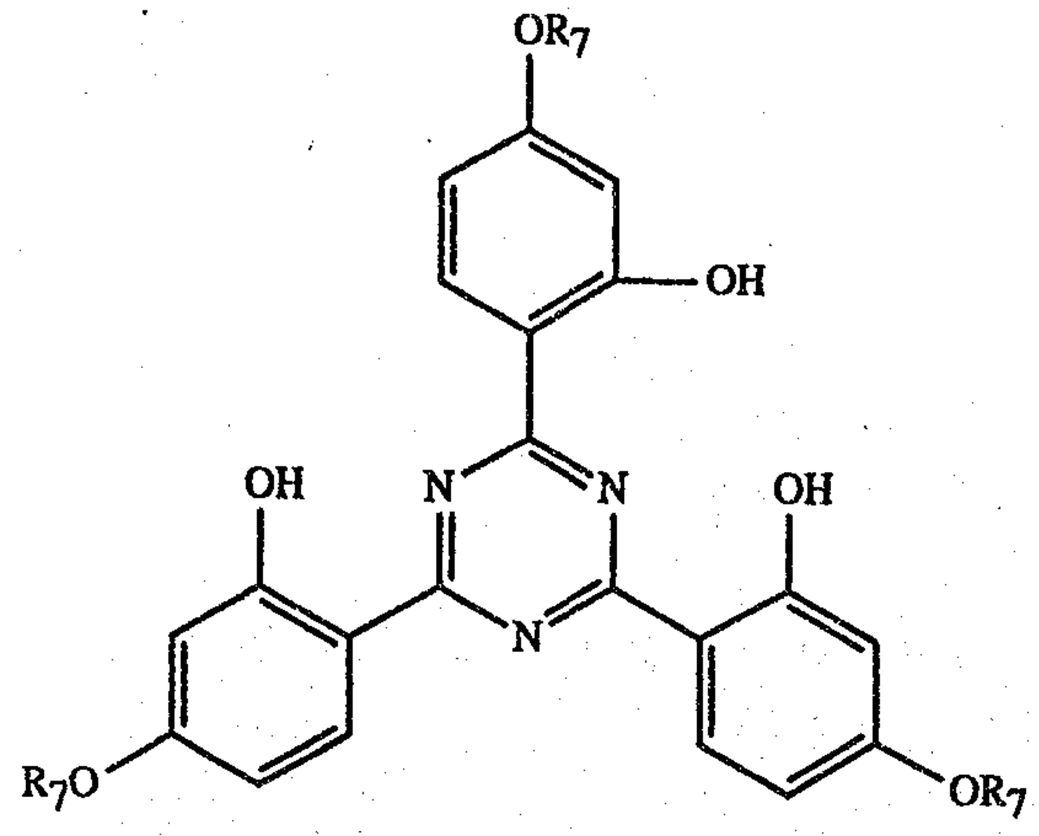
$-CH_2CH_2OC_4H_9$

$-CH_2CH_2COC_2H_5$

$-CH_2COOC_8H_{17}$

$-CH_2CH(OH)CH_2OC_4H_9$

$-CH_2CH(OH)CH_2Ophenyl$



R_7 = $-C_2H_5$

$-C_4H_9$

$-C_6H_{13}$
$-C_8H_{17}$
$-CH_2CH_2OH$
$-CH_2CH_2Ophenyl$
$-CH_2COOC_6H_{13}$
$-CH_2CH_2COO(CH_2CH_2O)_3H$
$-CH_2CH(OH)CH_2OC_6H_{13}$
$-CH_2CH(OH)CH_2phenyl$

The coating composition preferably contains, per 100 parts by weight of solid binder A, 0.01-20 parts by weight of curing catalyst B and 0.01-10 parts by weight of C, preferably 0.05-5 parts by weight of B and 0.2-5 parts by weight of C.

In addition to components A, B and C, the coating composition may contain further components such as solvents, pigments, dyes, plasticisers, stabilisers, thixotropic agents and/or levelling agents.

Normally the coating compositions will contain an organic solvent or mixture of solvents in which the binder is soluble. The coating composition can also, however, be an aqeuous solution or dispersion. The vehicle can also be a mixture of an organic solvent and water. The coating composition can also be a high solids paint or be solvent-free (powder-coating composition).

The pigments may be inorganic, organic or metallic pigments. Preferably the coating compositions of the invention do not contain pigments and are used as clear coating compositions.

In addition to the stabiliser of formula I, the coating compositions may contain further stabilisers such as antioxidants, other light stabilisers, metal deactivators, phosphites or phosphonites.

Exemplary of such additional stabiliserrs are:

1.1. Alkylated monophenols, for example 2,6-di-tert-butyl-4-methylphenol, 2-tert-butyl-4,6-dimethylphenol, 2,6-di-tert-butyl-4-ethylphenol, 2,6-di-tert-butyl-4-n-butylphenol, 2,6-di-tert-butyl-4-isobutylphenol, 2,6-dicyclopentyl-4-methylphenol,

2-(α-methylcyclohexyl)-4,6-dimethylphenol, 2,6-dioctadecyl-4-methylphenol, 2,4,6-tri-cyclohexylphenol, 2,6-di-tert-butyl-4-methoxymethylphenol, 2,6-di-nonyl-4-methyl-phenol.

1.2. Alkylated hydroquinones, for example 2,6-di-tert-butyl-4-methoxyphenol, 2,5-di-tert-butylhydroquinone, 2,5-di-tert-amylhydroquinone, 2,6-diphenyl-4-octadecyloxy-phenol.

1.3. Hydroxylated thiodiphenyl ethers, for example 2,2'-thiobis(6-tert-butyl-4-methyl-phenol), 2,2'-thiobis(4-octylphenol), 4,4'-thiobis(6-tert-butyl-3-methylphenol), 4,4'-thiobis(6-tert-butyl-2-methylphenol).

1.4. Alkylidenebisphenols, for example 2,2'-methylenebis(6-tert-butyl-4-methylphenol), 2,2'-methylenebis(6-tert-butyl-4-ethylphenol), 2,2'-methylenebis[4-methyl-6-(α-methyl-cyclohexyl)phenol], 2,2'-methylenebis(4-methyl-6-cyclohexylphenol), 2,2'-methylene-bis(6-nonyl-4-methylphenol), 2,2'-methylenebis(4,6-di-tert-butylphenol), 2,2'-ethylidene-bis(4,6-di-tert-butylphenol), 2,2'-ethylidenebis(6-tert-butyl-4-isobutylphenol), 2,2'-methylenebis[6-(α-methylbenzyl)-4-nonylphenol], 2,2'-methylenebis[6-(α,α-dimethyl-benzyl)-4-nonylphenol], 4,4'-methylenebis(2,6-di-tert-butylphenol), 4,4'-methylene-bis(6-tert-butyl-2-methylphenol), 1,1-bis(5-tert-butyl-4-hydroxy-2-methylphenyl)butane, 2,6-bis(3-tert-butyl-5-methyl-2-hydroxybenzyl)-4-methylphenol, 1,1,3-tris(5-tert-butyl-4-hydroxy-2-methylphenyl)butane, 1,1-bis(5-tert-butyl-4-hydroxy-2-methyl-phenyl)-3-n-dodecylmercaptobutane, ethylene glycol bis[3,3-bis(3'-tert-butyl-4'-hydroxy-phenyl)butyrate], bis(3-tert-butyl-4-hydroxy-5-methylphenyl)dicyclopentadiene, bis[2-(3'-tert-butyl-2'-hydroxy-5'-methylbenzyl)-6-tert-butyl-4methylphenyl] terephthalate.

1.5. Benzyl compounds, for example 1,3,5-tris(3,5-di-tert-butyl-4-hydroxybenzyl)-2,4,6-trimethylbenzene, bis(3,5-di-tert-butyl-4-hydroxybenzyl) sulfide, isooctyl 3,5-di-tert-butyl-4-hydroxybenzylmercaptoacetate, bis(4-tert-butyl-3-hydroxy-2,6-dimethylbenzyl) dithiolterephthalate, 1,3,5-tris(3,5-di-tert-butyl-4-hydroxybenzyl) isocyanurate, 1,3,5-tris(4-tert-butyl-3-hydroxy-2,6-dimethylbenzyl) isocyanurate, dioctadecyl 3,5-di-tert-butyl-4-hydroxybenzylphosphonate, calcium salt of monoethyl 3,5-di-tert-butyl-4-hydroxybenzylphosphonate, 1,3,5-tris(3,5-dicyclohexyl-4-hydroxybenzyl)isocyanurate.

1.6. Acylaminophenols, for example 4-hydroxylauranilide, 4-hydroxystearanilide, 2,4-bis(octylmercapto)-6-(3,5-di-tert-butyl-4-hydroxyanilino)-s-triazine, octyl N-(3,5-di-tert-

butyl-4-hydroxyphenyl)carbamate.

1.7. Esters of ß-(3,5-di-tert-butyl-4-hydroxyphenyl)propionic acid with mono- or polyhydric alcohols, e.g. with methanol, octadecanol, 1,6-hexanediol, neopentyl glycol, triethylene glycol, pentaerythritol, tris(hydroxyethyl) isocyanurate, thiodiethylene glycol, N,N'-bis(hydroxyethyl)oxalodiamide.

1.8. Esters of ß-(5-tert-butyl-4-hydroxy-3-methylphenyl)propionic acid with mono- or polyhydric alcohols, e.g. with methanol, diethylene glycol, octadecanol, triethylene glycol, 1,6-hexanediol, pentaerythritol, neopentyl glycol, tris(hydroxyethyl) isocyanurate, thiodiethylene glycol, N,N'-bis(hydroxyethyl)oxalodiamide.

1.9. Esters of ß-(3,5-dicyclohexyl-4-hydroxyphenyl)propionic acid with mono- or polyhydric alcohols, e.g. with methanol, diethylene glycol, octadecanol, triethylene glycol, 1,6-hexanediol, pentaerythritol, neopentyl glycol, tris(hydroxyethyl) isocyanurate, thiodiethylene glycol, N,N'-bis(hydroxyethyl)oxalodiamide.

1.10. Amides of ß-(3,5-di-tert-butyl-4-hydroxyphenyl)propionic acid e.g. N,N'-bis(3,5-di-tert-butyl-4-hydroxyphenylpropionyl)hexamethylenediamine, N,N'-bis(3,5-di-tert-butyl-4-hydroxyphenylpropionyl)trimethylenediamine, N,N'-bis(3,5-di-tert-butyl-4-hydroxyphenylpropionyl)hydrazine.

2. UV absorbers and light stabilisers

2.1. 2-(2'-Hydroxyphenyl)benzotriazoles, for example the 5'-methyl, 3',5'-di-tert-butyl, 5'-tert-butyl, 5'-(1,1,3,3-tetramethylbutyl), 5-chloro-3',5'-di-tert-butyl, 5-chloro-3'-tert-butyl-5'-methyl, 3'-sec- butyl-5'-tert-butyl, 4'-octoxy, 3',5'-di-tert-amyl and 3',5'-bis(α,α-dimethylbenzyl) derivative.

2.2. 2-Hydroxybenzophenones, for example the 4-hydroxy, 4-methoxy, 4-octoxy, 4-decyloxy, 4-dodecyloxy, 4-benzyloxy, 4,2',4'-trihydroxy and 2'-hydroxy-4,4'-dimethoxy derivative.

2.3. Esters of substituted and unsubstituted benzoic acids, for example, 4-tert-butylphenyl salicylate, phenyl salicylate, octylphenyl salicylate, dibenzoylresorcinol, bis(4-tert-butylbenzoyl)-resorcinol, benzoylresorcinol, 2,4-di-tert-butylphenyl

3,5-di-tert-butyl-4-hydroxy- benzoate and hexadecyl 3,5-di-tert-butyl-4-hydroxybenzoate.

2.4. Acrylates, for example ethyl α-cyano-β,β-diphenylacrylate, isooctyl α-cyano-β,β-diphenylacrylate, methyl α-carbomethoxycinnamate, methyl α-cyano-β-methyl-p-methoxy-cinnamate, butyl α-cyano-β-methyl-p-methoxy- cinnamate, methyl α-carbo-methoxy-p-methoxycinnamate and N-(β-carbomethoxy-β-cyanovinyl)-2-methylindoline.

2.5. Nickel compounds, for example nickel complexes of 2,2'-thio-bis[4-(1,1,3,3-tetra-methylbutyl)phenol], such as the 1:1 or 1:2 complex, with or without additional ligands such as n-butylamine, triethanolamine or N-cyclohexyldiethanolamine, nickel dibutyl-dithiocarbamate, nickel salts of 4-hydroxy-3,5-di-tert-butylbenzyl-phosphonic acid monoalkyl esters, e.g. of the methyl or ethyl ester, nickel complexes of ketoximes, e.g. of 2-hydroxy-4-methyl-phenyl undecyl ketoneoxime, nickel complexes of 1-phenyl-4-lauroyl-5-hydroxypyrazole, with or without additional ligands.

2.6. Sterically hindered amines, for example bis(2,2,6,6-tetramethylpiperidyl) sebacate, bis(1,2,2,6,6-pentamethylpiperidyl) sebacate, bis(1,2,2,6,6-pentamethylpiperidyl) n-butyl-3,5-di-tert-butyl-4-hydroxy-benzylmalonate, the condensation product of 1-(2-hydroxyethyl)-2,2,6,6-tetramethyl-4-hydroxypiperidine and succinic acid, the condensation product of N,N'-bis(2,2,6,6-tetramethyl-4-piperidyl)hexamethylenediamine and 4-tert-octylamino-2,6-dichloro-1,3,5-s-triazine, tris(2,2,6,6-tetramethyl-4-piperidyl)-nitrilotriacetate, tetrakis(2,2,6,6-tetramethyl-4-piperidyl)-1,2,3,4-butanetetraoate, 1,1'-(1,2-ethanediyl)bis-(3,3,5,5-tetramethylpiperazinone).

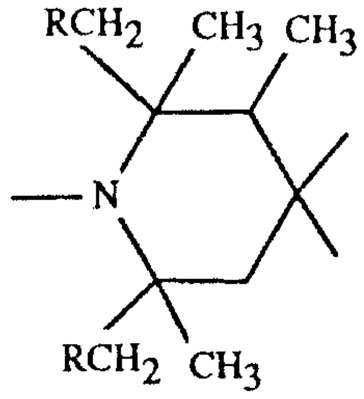
2.7. Oxalyl diamides, for example 4,4'-dioctyloxyoxanilide, 2,2'-dioctyloxy-5,5'-di-tert-butoxanilide, 2,2'-didodecyloxy-5,5'-di-tert-butoxanilide, 2-ethoxy-2'-ethyloxanilide, N,N'-bis(3-dimethylaminopropyl)oxalamide, 2-ethoxy-5-tert-butyl-2'-ethyloxanilide and its mixture with 2-ethoxy-2'-ethyl-5,4'-di-tert-butoxanilide and mixtures of ortho- and para-methoxy-disubstituted oxanilides and mixtures of o- and p-ethoxydisubstituted oxanilides.

3. Metal deactivators, for example N,N'-diphenyloxalyl diamide, N-salicylal-N'-salicyloylhydrazine, N,N'-bis(salicyloyl)hydrazine, N,N'-bis(3,5-di-tert-butyl-4-hydroxyphenylpropionyl)hydrazine, 3-salicyloylamino-1,2,4-triazole, bis-(benzylidene)oxalic dihydrazide.

4. Phosphites and phosphonites, for example triphenyl phosphite, diphenylalkyl phosphites, phenyldialkyl phosphites, tris(nonylphenyl) phosphite, trilauryl phosphite, trioctadecyl phosphite, distearyl pentaerythritol diphosphite, tris(2,4-di-tert-butylphenyl) phosphite, diisodecyl pentaerythritol diphosphite, bis(2,4-di-tertbutylphenyl) penta-erythritol diphosphite, tristearyl sorbitol triphosphite, tetrakis-(2,4-di-tert-butylphenyl) 4,4'-biphenylene diphosphonite, 3,9-bis(2,4-di-tert-butylphenoxy)-2,4,8,10-tetraoxa-3,9-diphosphaspiro[5.5]undecane.

To achieve maximum light stabilisation it is particularly expedient to add the sterically hindered amines listed in 2.6 above. Accordingly, the invention also relates to a coating composition which, in addition to containing components A, B and C, contains a light stabiliser of the sterically hindered amine type as component D.

The preferred light stabiliser of component D is a 2,2,6,6-tetraalkylpiperidine derivative which contains at least one group of formula



wherein R is hydrogen or methyl, preferably hydrogen.

Component D will preferably be used in an amount of 0.5-5 parts by weight per 100 parts by weight of the solid binder.

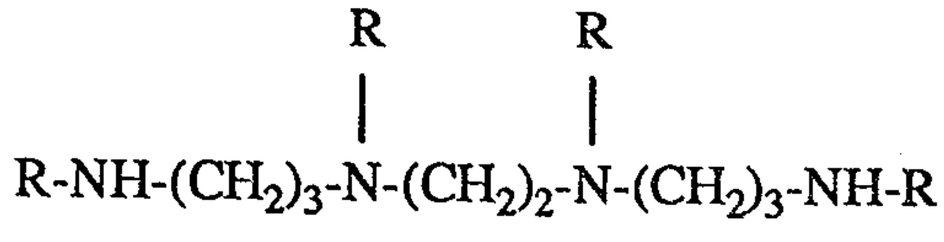
Examples of tetraalkylpiperidine derivatives will be found in EP-A-356 677, pages 3-17, paragraphs a) to f). It is particularly preferred to use the following tetraalkylpiperidine derivatives:

bis(2,2,6,6-tetramethylpiperidin-4-yl)succinate,

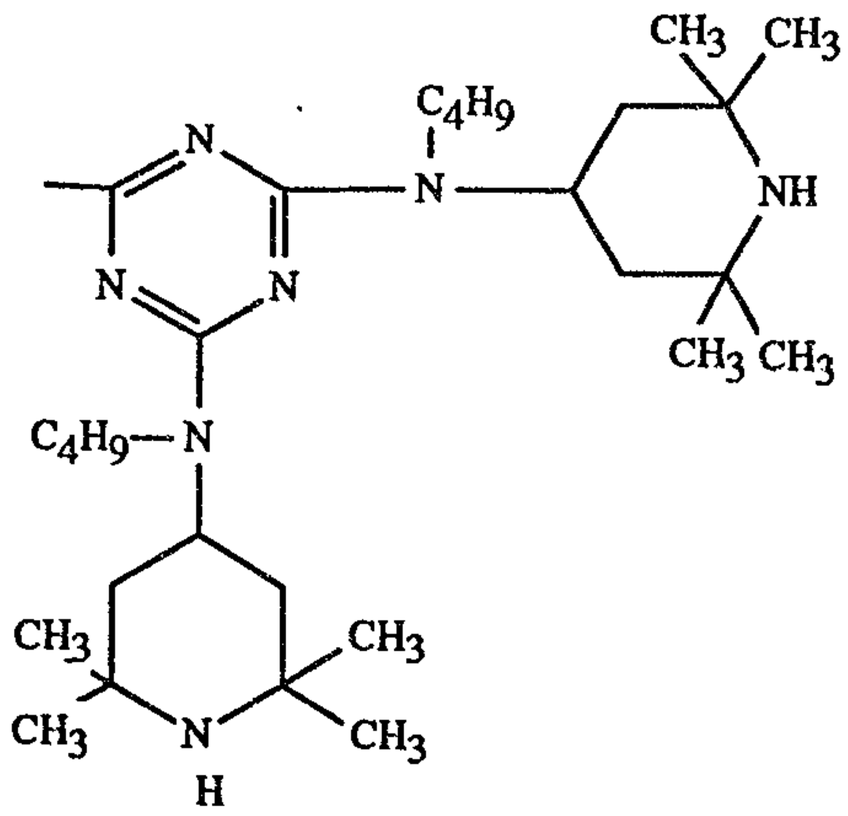
bis(2,2,6,6-tetramethylpiperidin-4-yl)sebacate,

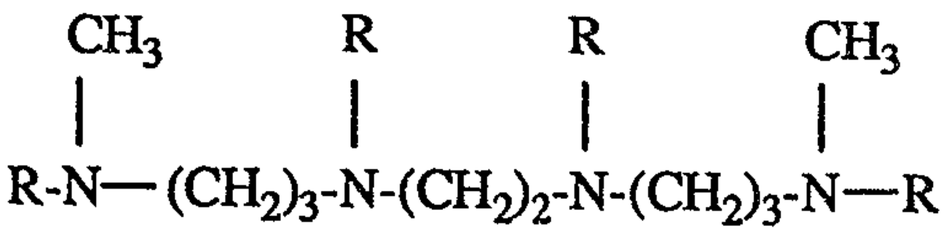
bis(1,2,2,6,6-pentamethylpiperidin-4-yl)-sebacate,

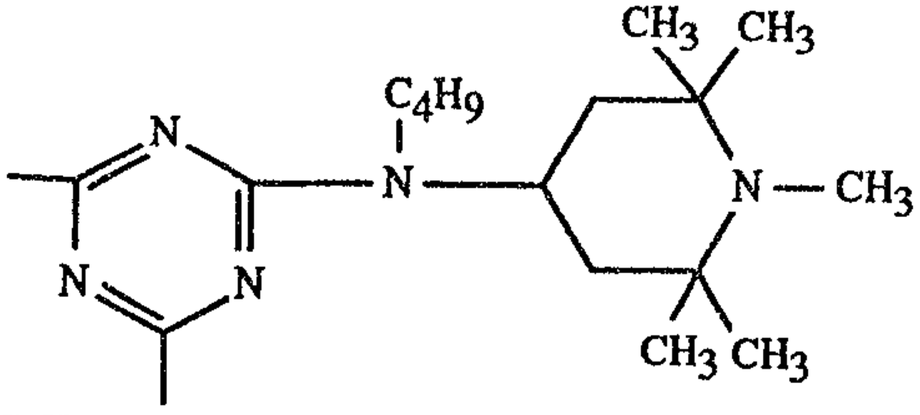
bis(1,2,2,6,6-pentamethylpiperidin-4-ylbutyl(3,5-di-tert-butyl-4-hydroxybenzyl)malonate
bis(1-octyloxy-2,2,6,6-tetramethylpiperidin-4-yl)-sebacate,
tetra(2,2,6,6-tetramethylpiperidin-4-yl)butane-1,2,3,4-tetracarboxylate,
tetra(1,2,2,6,6-pentamethylpiperidin-4-yl)butane-1,2,3,4-tetracarboxylate,
2,2,4,4-tetramethyl-7-oxa-3,20-diaza-21-oxo-dispiro[5.1.11.2]-heneicosane,
8-acetyl-3-dodecyl-1,3,8-triaza-7,7,9,9-tetramethylspiro[4,5]-decane-2,4-dione,
or a compound of formulae



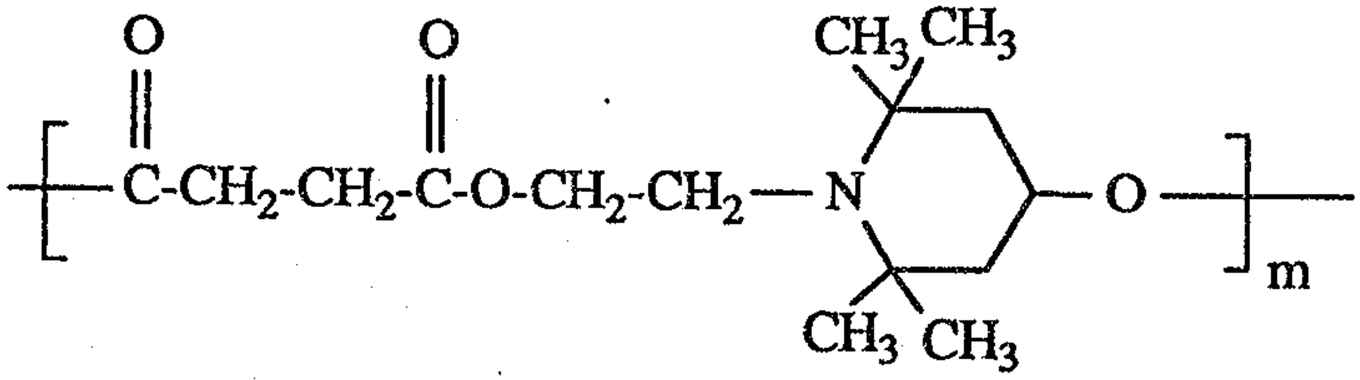
where R =

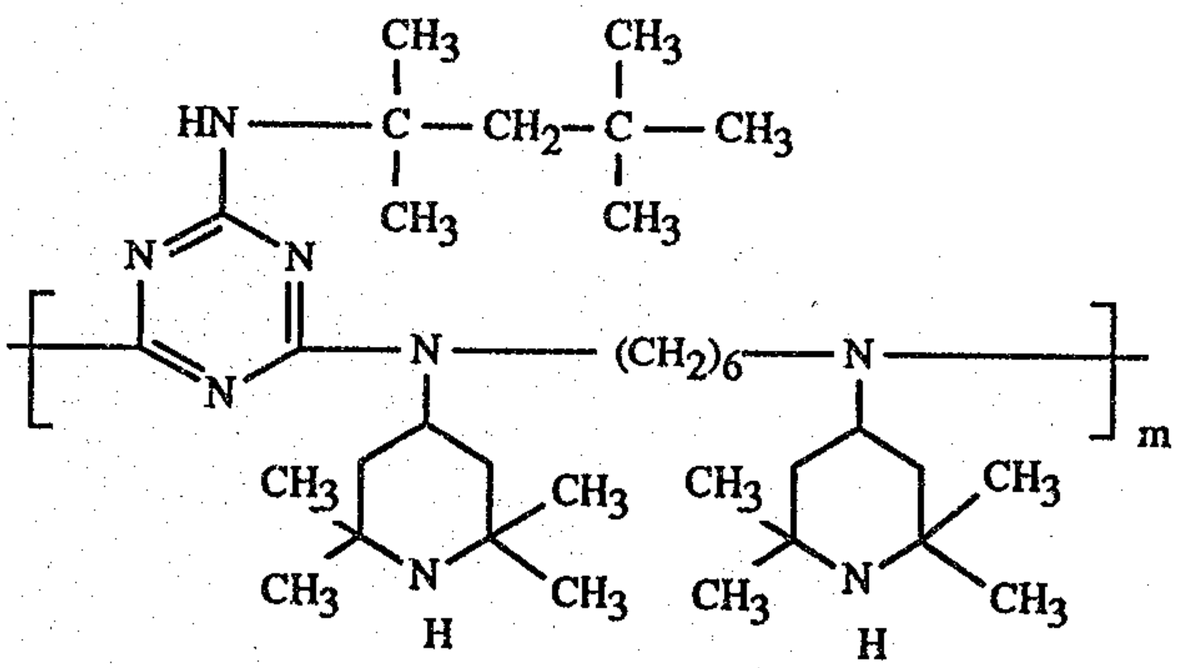


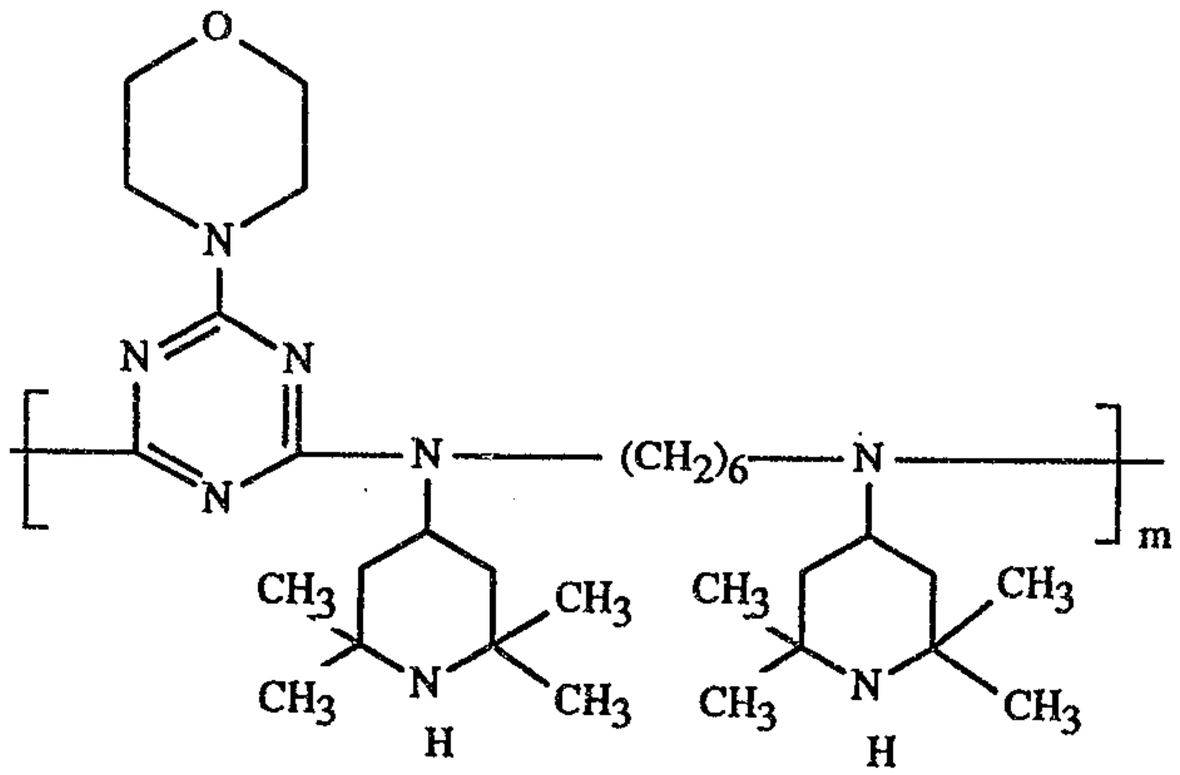




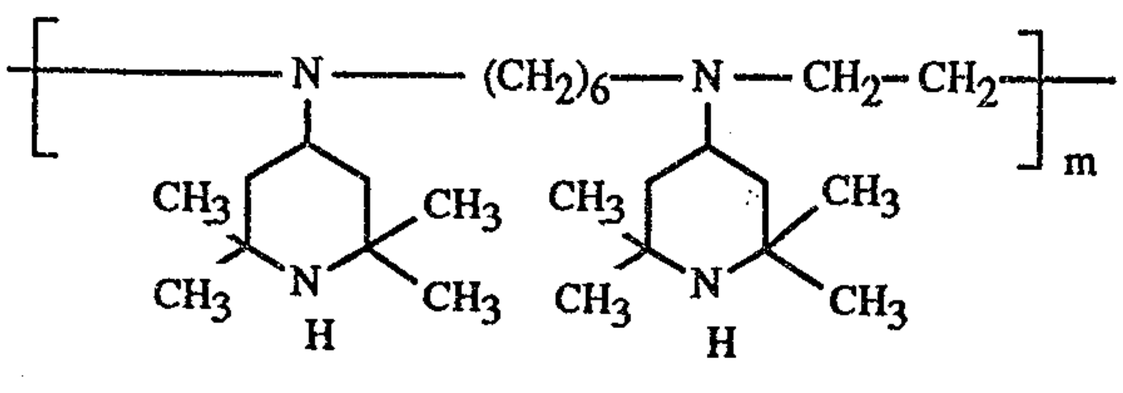
where R =







or



wherein m is a value from 5-50.

The coating compositions of this invention can be applied to any substrates, for example to metal, wood, plastics or ceramic materials. They are preferably used as finishing paints in the automobile industry. If the finish consists of two coats, the undercoat being pigmented and the topcoat unpigmented, then the coating composition of this invention can be used for the topcoat or for the undercoat or for both coats, but preferably for the topcoat.

The coating compositions of this invention can be applied to the substrates by conventional techniques, for example by brushing, spraying, coating, immersion or electrophoresis.

Depending on the binder systems, the finishes can be cured at room temperature or by heating. The finishes are preferably cured in the temperature range from 50-150°C. Powder-coating compositions are also cured at higher temperatures.

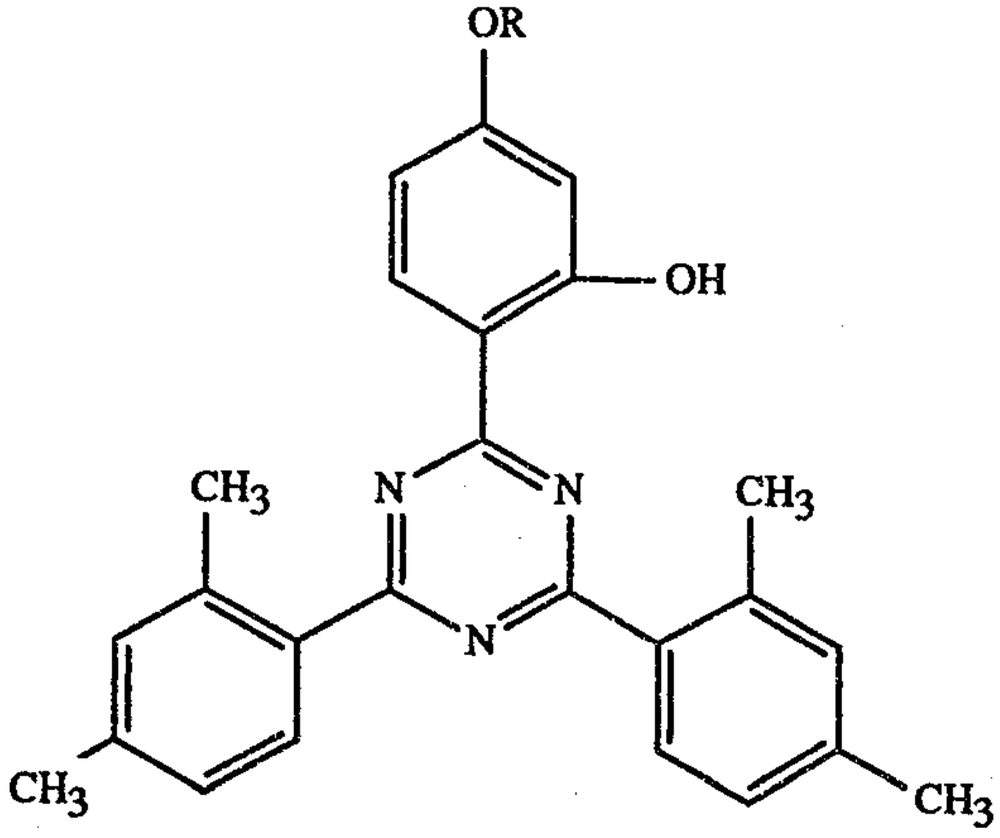
The finishes obtained have excellent light stability and also enhanced thermo-oxidative

resistance.

A further embodiment of the invention comprises using those binders in which a 2-hydroxyphenyl-s-triazine is incorporated by copolymerisation or copolycondensation. Suitable for this utility are those compounds of formula I wherein R_7 contains a copolymerisable ethylenically unsaturated group or a functional group which is suitable for copolycondensation. In this case, the coating composition may consist of only components A and B.

The following Examples illustrate the coating compositions of this invention in more detail without implying any restriction of the invention to the Examples. Parts and percentages are by weight.

The following UV absorbers of the invention are used in the Examples:



UV-1: R = $-C_8H_{17}$

UV-2: R = $-CH_2CH(OH)CH_2OC_4H_9$

UV-3: R = $-CH_2COO(CH_2)_8CH{=}CH-C_8H_{17}$

UV-4: R = -H

UV-5: R = $-CH_2CH(OH)CH_2OCH_2\underset{C_2H_5}{\underset{|}{C}}H-C_4H_9$

UV-6: R = $-CH_2CH(OH)CH_2O(CH_2)_{\overline{12\text{-}14}}CH_3$

In addition, the following UV absorbers are used for comparison purposes:

V-1: the reaction product of 2-[2-hydroxy-3-tert-butyl-5-(2-methoxycarbonylethyl)-phenyl]benzotriazole with polyethylene glycol 300

V-2: 2-hydroxy-4-dodecycloxybenzophenone

V-3: 2,4-dihydroxybenzophenone

V-4: 2-[2-hydroxy-3,5-di(α,α-dimethylbenzyl)phenyl]benzotriazole.

Example 1 - Two-component polyacrylate-urethane coating composition containing a combination of a metal-containing catalyst and an amine

A hydroxyl group containing acrylate coating composition is prepared by mixing the following components:

75	parts	of a 60 % solution of a hydroxyl group containing acrylate resin in xylene (Macrynal® SM 510, Hoechst AG)
15	parts	of butyl glycol acetate
6.1	parts	of an aromatic solvent mixture (Solvesso® 100, Esso AG)
3.6	parts	of methyl isobutyl ketone
0.1	part	of zink octoate (as 8 % soloution in toluene)
0.2	part	of a levelling agent (Byk® 300, Byk-Chemie).

To this composition are added 1.5 parts of a UV absorber listed in Table 1 (dissolved in 5-10 parts of xylene). This addition corresponds to 2 % of UV absorber, based on binder solids (acrylate + isocyanate).

These formulations are blended with 30 parts of a trimerised diisocyanate (Desmodur® N 75, Bayer AG) and 1.5 parts of diazabicyclooctane (corresponding to 2 %, based on binder solids).

Samples of these coating formulation are applied to aluminium sheets coated with a white coil coat and cured for 30 minutes at 60°C. The coating thickness is ca. 40 µm.

The coated test pieces are exposed to weathering in a UVCON/ Weather-O-Meter (Atlas Corp., UVB-313 lamps, cycle: 4 h UV light at 60°C, 4 h condensation at 50°C). The Yellowness Index (YI) according to ASTM D 1925 is measured after 24 hours.

Table 1

UV Absorber	YI after 24 h UVCON
2 % UV-1	1.2
2 % UV-2	0.5
2 % UV-3	2.3
2 % V-1	6.5

Example 2 - Polyacrylate-melamine coating composition containing a metal chelate catalyst

A clear composition is prepared from:

59.2	parts	of a 50 % solution of a hydroxyl group containing acrylate resin (Uracron® 2263B, DSM Resins NV)
11.6	parts	of a 90 % melamine resin (Cymel® 327, Amer. Cyanamid Corp.)
19.4	parts	of xylene
5.5	parts	of butyl glycol acetate
3.3	parts	of butanol
1.0	part	of a 1 % solution in xylene of a levelling agent (Baysilon® A, Bayer AG).

This composition has a 40 % solids content (binder). To the composition is added 0.8 part of a UV absorber listed in Table 2 (dissolved in 5-10 parts of xylene), corresponding to 2 %, based on binder solids.

To this formulation are then added 1.6 parts of aluminium tris(acetylacetonate), dissolved in xylene, corresponding to 4 %, based on binder solids

The clear coating composition so obtained is applied with a doctor blade to aluminium sheets coated with a white coil coat. The coating is cured for 30 minutes at 130°C. The clear coating thickness is ca. 40 µm. The Yellowness Index (YI) according to ASTM D 1925 is then measured.

Table 2

UV Absorber	YI after the cure
none	-1.8
2 % UV-1	-1.6
2 % UV-4	0.9
2 % V-2	16.8
2 % V-3	28.6
2 % V-4	25.6

Example 3 - Polyacrylate-epoxy resin coating composition containing an amine catalyst

A clear coating composition is prepared by mixing the following components:

57.5 parts of a 50% solution of a functional acrylate resin (Ucar® 882, Union Carbide Co.)

0.3 part of a levelling agent (Baysilon® OL 17, Bayer AG) (20 %)

3.7 parts of an aliphatic polyglycidyl ether (Ucarlink® Crosslinker, Union Carbide Co.)

3.5 parts of n-butanol

35 parts of xylene

100

The clear coating composition has a ca. 33 % solids content and to it are added 2 % (based on solids) of diazabicyclooctane (dissolved in xylene) as accelerator and 2 % (based on solids) of a UV absorber listed in Table 3.

The test formulations are diluted with xylene to a sprayable consistency and sprayed on to aluminium sheets coated with a white coil coat. The samples are air-dried for 15 minutes and then cured for 30 minutes at 70°C. The dry film thickness is ca. 40 µm. The coated test pieces are then heated for 30 minutes to 100°C and the Yellowness Index according to ASTM D 1925 is measured.

Table 3

UV Absorber	Yellowness Index
UV-1	1.4
UV-5	1.3
V-3	8.5

Example 4 - Polyacrylate-epoxy resin coating composition containing an amine catalyst

The procedure of Example 3 is repeated, except that the clear coating composition is applied to aluminium sheets coated with a silver metallic primer lacquer. After curing (30 minutes at 70°C), the coated test pieces are subjected to weathering in a UVCON Weather-O-Meter with UVB 313 lamps (cycle: 8 h UV light at 70°C, 4 h condensation at 50°C). The Yellowness Index is measured after 48 h exposure.

Table 4

UV Absorber	Yellowness Index
2 % UV-1	-0.7
2 % UV-5	-0.6
V-3	3.9

Example 5 - Two-component polyacrylate coating composition containing an amino group containing resin

Component A:

59	parts	of an amino group containing polyacrylate (Setalux® AA-8402 XS 55 AKZO Resins BV) (55 % solution)
19	parts	of butyl acetate
13.7	parts	of xylene
3	parts	of 1-methoxy-1-propylacetate
3	parts	of diacetone alcohol
1.5	parts	of isobutanol
0.5	part	of levelling agent I (Byk®300, Byk-Chemie GmbH)
0.3	part	of levelling agent II (Baysilon® MA, Bayer AG)
100		

Component B:

36	parts	of an epoxy group containing polyacrylate (Setalux® AA 8501 BX 60, AKZO Resins BV) (60 % solution)
9	parts	of butyl acetate
5	parts	of xylene
50		

Component C:

10	parts	of xylene
8	parts	of diacetone alcohol
7	parts	of 1-methoxy-2-propylacetate
5	parts	of isobutanol
30		

Components A, B and C are mixed to give a clear coating composition having a ca. 30 % solids content.

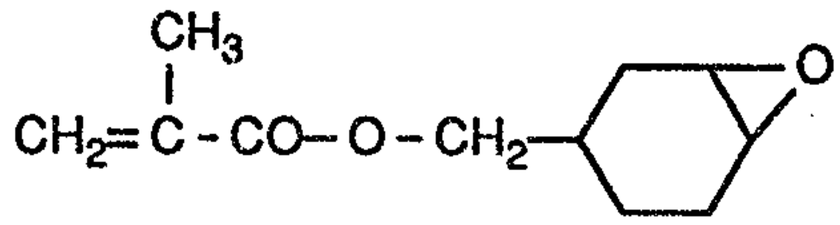
The sample compositions are applied with a doctor blade to aluminium sheets coated with a white coil coat, and cured for 30 minutes as 60°C. The dry film thickness is ca. 30 µm. The Yellowness Index of the coated test pieces is measured after storage for 48 hours at room temperature.

Table 5

UV Absorber	Yellowness Index
none	-0.7
2 % UV-1	-0.1
2 % UV-2	0.6
2 % UV-5	0.1
2 % UV-6	-0.1
2 % V-1	6.5
2 % V-2	7.1
2 % V-3	8.3
2 % V-4	13.0

Example 6 - Polyacrylate resin containing alkoxysilane groups and a metal chelate catalyst

A copolymer of 35 % of methyl acrylate, 50 % of 3-(trimethoxysilyl)propylmethacrylate and 15 % of



is prepared according to US-A-4 772 672. The resultant resin has a molecular weight (Mw) of 21 300 and contains 0.56 mol/kg of epoxide oxygen.

The copolymer is dissolved in methyl isobutyl ketone, and 2 % of UV absorber and 5 % of aluminium tris(acetylacetonate) are added (in each case based on solids). The coating composition is applied with a doctor blade to aluminium sheets provided with a white

coil coat and cured for 30 minutes at 130°C. The dry film thickness is ca. 18 µm. The Yellowness Index of the coated test pieces is then measured.

Table 6

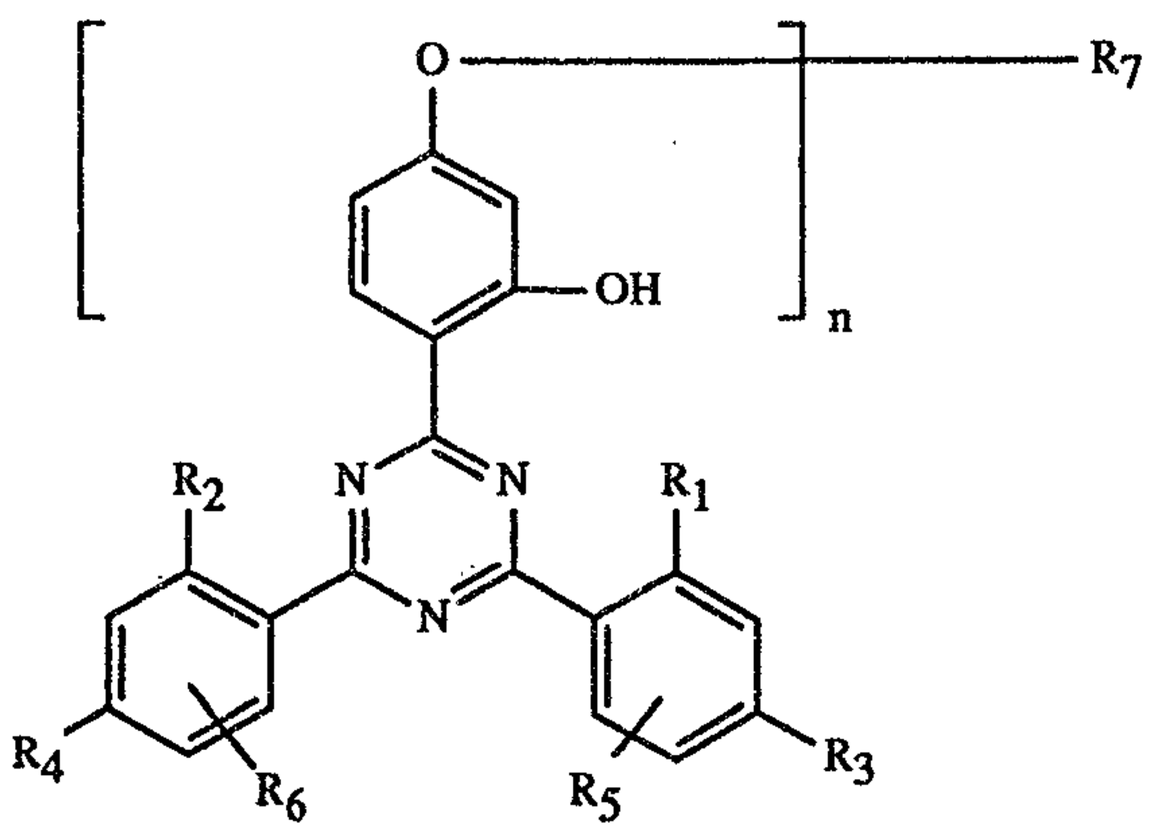
UV Absorber	Yellowness Index
2 % UV-5	2.2
2 % V-2	6.3
2 % V-3	7.9

A-17964/1+2/+

Coating compositions stabilised against light, heat and oxygen

Abstract of the Disclosure

o-Hydroxyphenyl-s-triazines of formula I



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wherein n is 1 or 2 and R_1 to R_7 are as defined in claim 7, are good light stabilisers for coating compositions which contain a basic curing catalyst. In contradistinction to other UV absorbers, they do not cause discolourations in the presence of such catalysts.

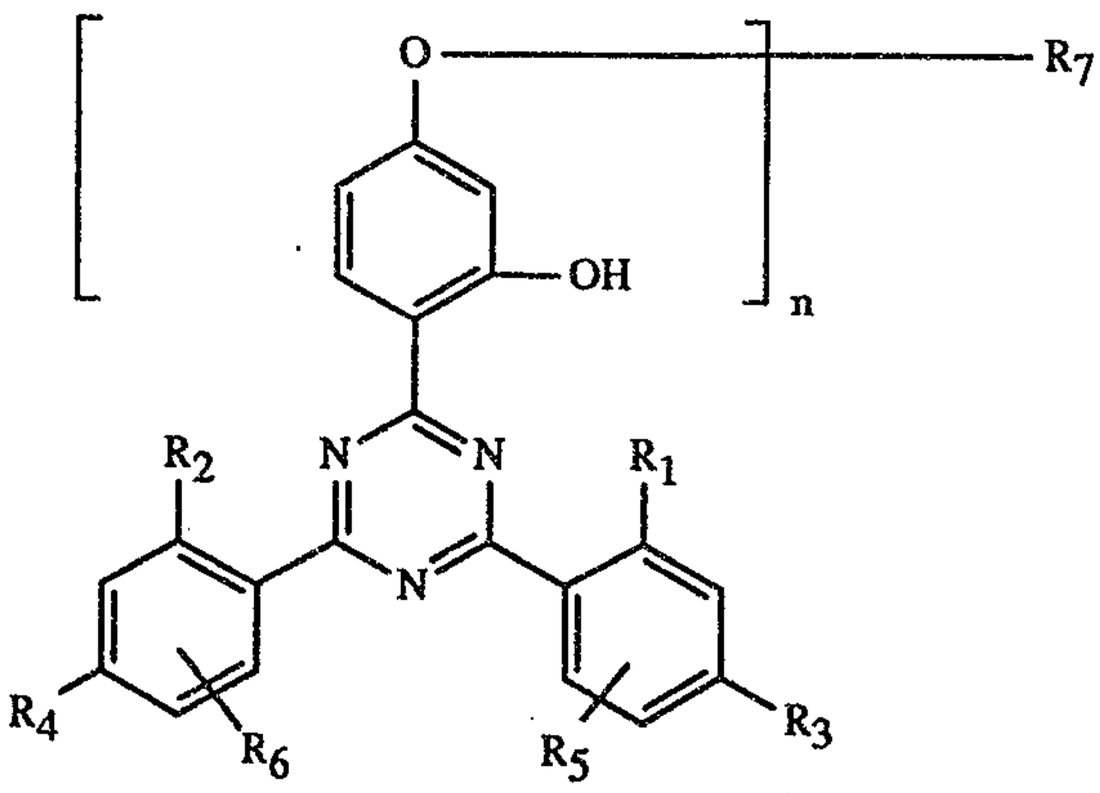
What is claimed is:

1. A coating composition comprising

A) a binder,

B) as curing catalyst, an organic metallic compound and/or an amine and/or an amino group containing resin and/or a phosphine, and

C) as stabiliser against damage induced by light, heat and oxygen, a compound of formula I



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wherein n is 1 or 2,

R_1 and R_2 are each independently of the other H, OH, C_1-C_{12}alkyl or halomethyl,

R_3 and R_4 are each independently of the other H, OH, C_1-C_{12}alkyl, C_1-C_{18}alkoxy or halogen and, when n = 1, may also be a radical -OR_7,

R_5 and R_6 are each independently of the other H, C_1-C_{12}alkyl or halogen,

R_7, when n is 1, is hydrogen, C_1-C_{18}alkyl or C_1-C_{12}alkyl which is substituted by OH, C_1-C_{18}alkoxy, halogen, phenoxy or phenoxy which is substituted by C_1-C_{18}alkyl, C_1-C_{18}alkoxy or halogen, -COOH, -$COOR_8$, -$CONH_2$, -$CONHR_9$, -$CON(R_9)(R_{10})$, -NH_2, -NHR_9, -$N(R_9)(R_{10})$, -$NHCOR_{11}$, -CN and/or -$OCOR_{11}$, or R_7 is C_4-C_{20}alkyl which is interrupted by one or more oxygen atoms and substituted by OH or C_1-C_{12}alkoxy, or is C_3-C_6alkenyl, glycidyl, C_5-C_8cycloalkyl, cyclohexyl which is substituted by OH, C_1-C_4alkyl or -$OCOR_{11}$, C_7-C_{11}phenylalkyl which is unsubstituted or substituted by OH, Cl or CH_3, or is -CO-R_{12} or -SO_2-R_{13}, and, when n is 2, is C_2-C_{16}alkylene, C_4-C_{12}alkenylene, xylylene, C_3-C_{20}alkylene which is interrupted by one or more oxygen atoms and/or substituted by OH, a -$CH_2CH(OH)CH_2O$-R_{15}-$OCH_2CH(OH)CH_2$-,

-CO-R_{16}-CO-, -CO-NH-R_{17}-NH-CO- or -$(CH_2)_m$-COO-R_{18}-OCO-$(CH_2)_m$- group, wherein m is 1-3,

R_8 is C_1-C_{18}alkyl, C_3-C_{18}alkenyl, C_3-C_{20}alkyl which is interrupted by O, N or S and/or substituted by OH, C_1-C_4alkyl which is substituted by -$P(O)(OR_{14})_2$, -$N(R_9)(R_{10})$ or -$OCOR_{11}$ and/or OH, or is glycidyl, cyclohexyl or C_7-C_{11}phenylalkyl,

R_9 and R_{10} are each independently of the other C_1-C_{12}alkyl, C_3-C_{12}alkoxyalkyl, C_4-C_{16}dialkylaminoalkyl or C_5-C_{12}cycloalkyl, or

R_9 and R_{10}, when taken together, are C_3-C_9alkylene or C_3-C_9oxaalkylene or C_3-C_9azaalkylene,

R_{11} is C_1-C_{18}alkyl, C_2-C_{18}alkenyl or phenyl,

R_{12} is C_1-C_{18}alkyl, C_2-C_{18}alkenyl, phenyl, C_1-C_{12}alkoxy, phenoxy, C_1-C_{12}alkylamino, phenylamino, tolylamino or naphthylamino,

R_{13} is C_1-C_{12}alkyl, phenyl, naphthyl or C_7-C_{14}alkylphenyl,

R_{14} is C_1-C_{12}alkyl or phenyl,

R_{15} is C_2-C_{10}alkylene, phenylene or a phenylene-X-phenylene- group, wherein X is -O-, -S-, -SO_2-, -CH_2- or -$C(CH_3)_2$-,

R_{16} is C_2-C_{10}alkylene, C_2-C_{10}oxaalkylene or C_2-C_{10}thiaalkylene, phenylene, naphthylene, diphenylene or C_2-C_6alkenylene,

R_{17} is C_2-C_{10}alkylene, phenylene, naphthylene, methylenediphenylene or C_7-C_{15}alkylphenylene, and

R_{18} is C_2-C_{10}alkylene or C_4-C_{20}alkylene which is interrupted by oxygen.

2. A coating composition according to claim 1, wherein the binder (component A) is a system selected from:

a) an acrylate copolymer containing alkoxysilane or alkoxysiloxane side groups,

b) a two component system based on a hydroxyl group containing polyacrylate and/or polyester and an aliphatic or aromatic polyisocyanate,

c) a two component system based on a functional polyacrylate and a polyepoxide, said polyacrylate containing carboxyl, anhydride or amino groups,

d) a two component system based on a fluoro-modified or silicon-modified hydroxyl group containing polyacrylate or polyester and an aliphatic or aromatic polyisocyanate,

e) a two component system based on a (poly)ketimine and an aliphatic or aromatic polyisocyanate,

f) a two component system based on a (poly)ketimine and an unsaturated acrylate resin or acetoacetate resin or methyl-α-acrylamidomethyl glycolate,

g) a two component system based on an anhydride group containing polyacrylate and a

polyamine,

h) a two component system based on a (poly)oxazolidine and an anhydride group containing polyacrylate or an unsaturated acrylate resin or polyisocyanate,

i) a two component system based on an epoxy group containing polyacrylate and a carboxyl group containing or amino group containing polyacrylate,

k) an air-drying alkyd, acrylic or alkyd-acrylic resin, and

l) a polymer based on allyl glycidyl ether.

3. A coating composition according to claim 1, wherein component A is a binder based on a functional acrylate resin and a crosslinker.

4. A coating composition according to any one of claims 1 to 3, wherein the curing catalyst (component B) is a metal carboxylate or a metal chelate or an organotin compound or an amine.

5. A coating composition according to claim 4, wherein the curing catalyst is a carboxylate of a metal selected from the group consisting of Pb, Mn, Co, Zn, Zr and Cu, or is a chelate of a metal selected from the group consisting of Al, Ti and Zr, or is a tertiary amine.

6. A coating composition according to any one of claims 1 to 5, wherein component C is a compound of formula I, wherein n is 1 or 2,

R_1 and R_2 are each independently of the other H, OH or C_1-C_4alkyl,

R_3 and R_4 are each independently of the other H, OH, C_1-C_4alkyl, C_1-C_4alkoxy, halogen or a radical $-OR_7$,

R_5 and R_6 are each independently of the other H or C_1-C_4alkyl,

R_7, when n is 1, is hydrogen, C_1-C_{18}alkyl, C_1-C_6alkyl which is substituted by OH, C_1-C_{18}alkoxy, phenoxy, -$COOR_8$, -$CONHR_9$, -$CON(R_9)(R_{10})$ and/or -$OCOR_{11}$, or is allyl, glycidyl or benzyl, and, when n is 2, is C_4-C_{12}alkylene, C_4-C_6alkenylene, xylylene or C_3-C_{20}alkylene which is interrupted by oxygen and/or substituted by OH,

R_8 is C_1-C_{12}alkyl, C_3-C_{18}alkenyl, C_3-C_{20}alkyl which is interrupted by oxygen and/or substituted by OH, or C_1-C_4alkyl which is substituted by -$P(O)(OR_{14})_2$,

R_9 and R_{10} are each independently of the other C_1-C_8alkyl or cyclohexyl, or R_9 and R_{10}, when taken together, are pentamethylene or 3-oxapentamethylene,

R_{11} is C_1-C_8alkyl, C_2-C_5alkenyl or phenyl, and

R_{14} is C_1-C_4alkyl.

7. A coating composition according to any one of claims 1 to 5, wherein component C is a compound of formula I, wherein n is 1 or 2,

R_1 and R_2 are each independently of the other H or CH_3,

R_3 and R_4 are each independently of the other H, CH_3 or Cl,

R_5 and R_6 are hydrogen,

R_7, when n is 1, is hydrogen, C_1-C_{12}alkyl, C_1-C_4alkyl which is substituted by OH, C_4-C_{18}alkoxy, -$COOR_8$, -$CON(R_9)(R_{10})$ and/or -$OCOR_{11}$, or is glycidyl or benzyl, and, when n is 2, is C_6-C_{12}alkylene, 2-butenyl-1,4-ene, xylylene or C_3-C_{20}alkylene which is interrupted by oxygen and/or substituted by OH,

R_8 is C_4-C_{12}alkyl, C_{12}-C_{18}alkenyl, C_6-C_{20}alkyl which is interrupted by oxygen and/or substituted by OH, or is C_1-C_4alkyl which is substituted by $-P(O)(OR_{14})_2$,

R_9 and R_{10} are C_4-C_8alkyl,

R_{11} is C_1-C_8alkyl or C_2-C_3alkenyl, and

R_{14} is C_1-C_4alkyl.

8. A coating composition according to any one of claims 1 to 5, wherein component C is a compound of formula I, wherein n is 1 or 2 and R_7, when n is 1, is a $-CH_2CH(OH)CH_2O-R_{19}$ group, wherein R_{19} is C_1-C_{12}alkyl, phenyl, phenyl which is substituted by C_1-C_{12}alkyl, C_1-C_{12}alkoxy or halogen, or is C_3-C_5alkenoyl and, when n is 2, R_7 is a $-CH_2CH(OH)CH_2O-R_{15}-OCH_2CH(OH)CH_2-$ group, wherein R_{15} is as defined in claim 1.

9. A coating composition according to any one of claims 1 to 8, comprising, per 100 parts by weight of solid binder A, 0.01 to 20 parts by weight of curing catalyst B and 0.1 to 10 parts by weight of stabiliser C.

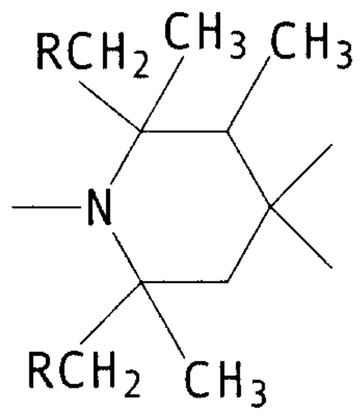
10. A coating composition according to any one of claims 1 to 8, comprising, per 100 parts by weight of A, 0.05 to 5 parts by weight of B and 0.2 to 5 parts by weight of C.

11. A coating composition according to any one of claims 1 to 10, comprising, in addition to components A, B and C, further components selected from solvents, pigments, dyes, plasticisers, stabilisers, thixotropic agents and/or levelling agents.

12. A coating composition according to claim 11, comprising, in addition to components A, B and C, a light

stabiliser of the sterically hindered amine type as component D.

13. A coating composition according to claim 12, wherein component D is a 2,2,6,6-tetraalkylpiperidine derivative which contains at least one group of formula



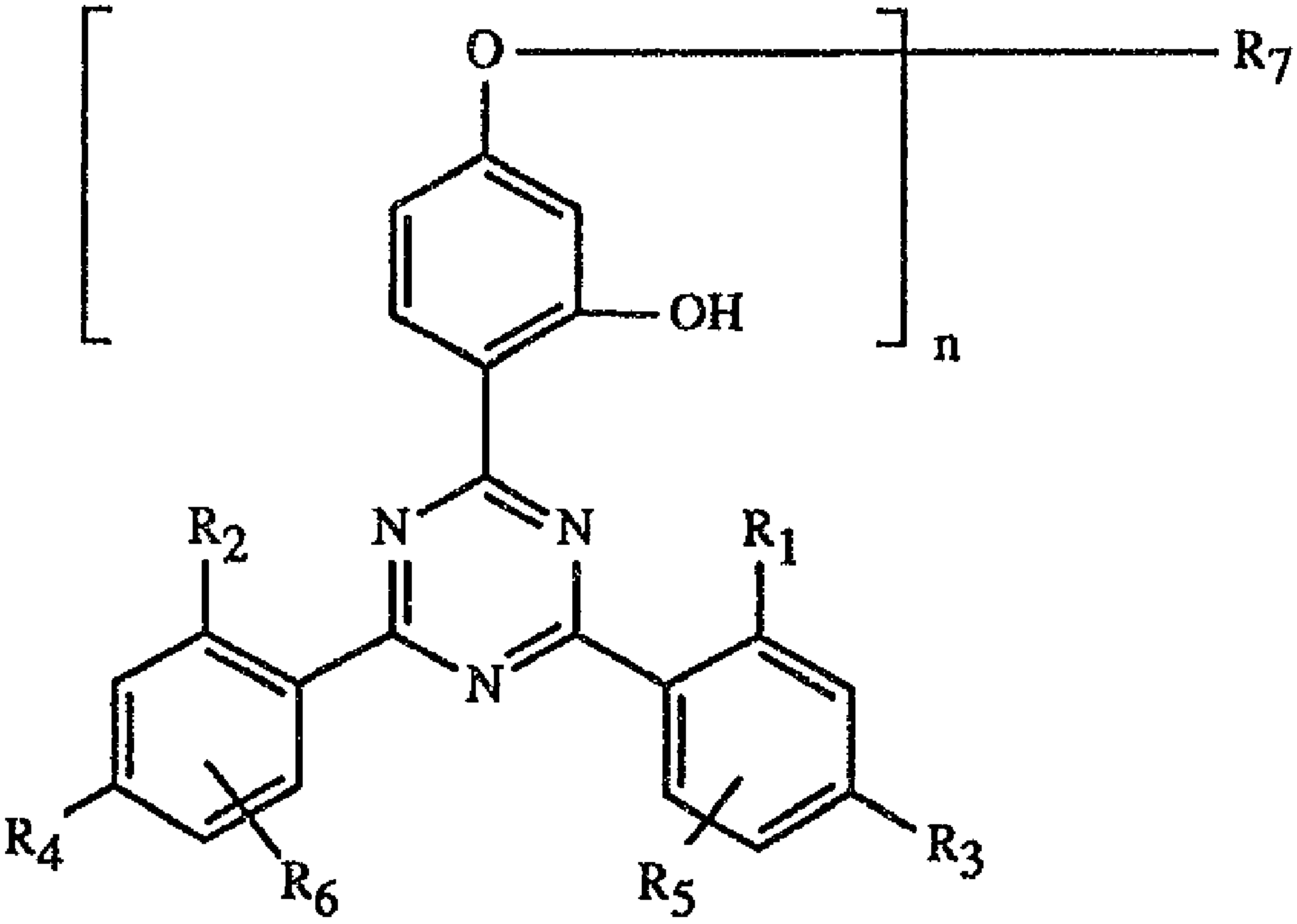
wherein R is hydrogen or methyl.

14. A coating composition according to claim 12, containing 0.05 to 5 parts by weight of a sterically hindered amine per 100 parts by weight of the binder.

15. Use of a coating composition according to any one of claims 1 to 14, as finishing paint for automobiles.

16. A cured film obtained by curing a coating composition as claimed in any one of claims 1 to 14.

17. Use of a compound of formula I according to any one of claims 1 to 14, as stabiliser for a coating composition which comprises a binder and at least one curing catalyst selected from the class of the organic metallic compounds, amines, amino group containing resins and phosphines.



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