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(71) Applicant: RHODIA OPERATIONS [FR/FR]; 40 rue de la Haie-Coq, F-93306 Aubervilliers (FR).

(72) Inventors: CHEN, Xi; 51 Science Park Road #04-01/09, The Aries, Singapore Science Park II, Singapore (SG).
ZHANG, Hai Zhou; 51 Science Park Road #04-01/09, The Aries, Singapore Science Park II, Singapore (SG).

(74) Agent: VALENTINO, Cedric; Rhodia Operations, Industrial Property Department, CRTL, BP62, 85 rue des Frères Perret, F-69192 Saint-fons (FR).

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(54) Title: TRANSLUCENT GEL SYSTEM

(57) Abstract: The present invention concerns a translucent gel system, notably a hair conditioner gel, comprising at least a carboxylic acid, an alkoxylated alkyl or alkenyl amine and a cationic surfactant. Such a translucent gel system provides an excellent conditioning effect for washing skin and/or hair and a high transmittance.



TRANSLUCENT GEL SYSTEM

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PRIOR ART

Human hair requires cleaning, since the hair fibers become soiled, both from environmental contamination as well as contamination and soiling from chemical agents produced by the body. Generally, shampooing is employed to
15 clean the hair by removing excess soil and body oils which have built up on the hair fibers. Unfortunately, while being capable of cleaning the hair fibers, shampoos generally leave the hair stripped, over-processed and difficult to manage. Recently, gel formulations of hair conditioners have become popular. There are extensive researches to develop new hair conditioner gels matching
20 with the need of the market and the different users, notably relative to the hair conditioning effects but also on the formulations aspects such as viscosity or colours and shades.

For particular market segments, there is a need to obtain translucent gel system.
25 Several hair conditioner gels may be found on the market but all of them are not translucent due to the presence of silicone, such as dimethicone, within the formulations. Other products are known for their translucent ability but can not be used as they show a negative impact on the gel obtaining leading to a drastic drop of viscosity, such as short chain carboxylic acids.

Thus, there is a need for a translucent gel system, notably for hair conditioner, providing a gel with a sufficient viscosity, an excellent conditioning effect for hair and a high transmittance.

5

INVENTION

The above-listed needs are met or exceeded by the present invention focused on a translucent gel system, notably a hair conditioner gel, comprising at least a carboxylic acid, an alkoxylated alkyl or alkenyl amine and a cationic surfactant.

10 Such a translucent gel system provides an excellent conditioning effect for washing skin and/or hair and a high transmittance.

The formulation of the present invention also provides a gel-type hair conditioner having the characteristic features described above which is capable
15 of being applied directly to the head of hair quickly and easily by merely spraying the gel formulation on the hair or via a container that is pumped through an orifice. The formulation of the invention also permits to obtain a greater control over the placement and the amount of hair conditioner applied to the hair. Still another need is for a hair styling device which reduces the time
20 required in the hair styling process. In addition, the present translucent gel system and its ability to be spread out on the hair without shading the hair reduces the time required for hair styling.

The present invention then concerns a gel system, notably a translucent gel
25 system, comprising at least :

- (1) 1-10 % by weight of a carboxylic acid having an alkyl or alkenyl chain comprising from 8 to 22 carbon atoms;
- (2) 1-10 % by weight of an alkoxylated alkyl or alkenyl amine;
- (3) 0.5-5 % by weight of a cationic surfactant;

(4) water.

The present invention also concerns a gel system, notably a translucent gel system, susceptible to be obtained by mixing at least the above identified
5 components.

These compositions of the invention may be formulated for washing skin and/or hair, for example, bath or shower gels, handwashing compositions, facial washing compositions, pre- and post- shaving products, and rinse-off and
10 wipe-off skin care products, and mainly to produce cleansing foam, body shampoo and hair shampoo.

“Alkyl” as used herein means a straight chain or branched saturated aliphatic hydrocarbon. As used herein, unless stated otherwise, the term "alkyl" means a
15 linear or branched alkyl group optionally substituted with one or more substituent selected from the group consisting of alkyl, alkoxy, alkylsulfanyl, alkylsulfenyl, alkylsulfonyl, oxo, hydroxy, mercapto, amino optionally substituted by alkyl, carboxy, carbamoyl optionally substituted by alkyl, aminosulfonyl optionally substituted by alkyl, nitro, cyano, halogen, or lower
20 perfluoroalkyl, multiple degrees of substitution being allowed. “Alkenyl”, as used herein, refers to a straight chain or branched aliphatic group containing at least one double bond and is intended to include both “unsubstituted alkenyls” and “substituted alkenyls”, the latter of which refers to alkenyl moieties having substituents replacing a hydrogen on one or more carbon atoms of the alkenyl
25 group.

Preferably the gel system provides an apparent viscosity comprised between 1000 and 100000 cps, more preferable comprised between 3000 and 50000 cps,

notably between 3000 and 25000 cps. The apparent viscosity is preferably measured on a Brookfield DV-II+ viscometer at 25°C, 10 rpm for 1 minute.

Preferably the gel system provides a transmittance comprised between 3 and 100%, more preferable comprised between 5 and 70%, notably between 5 and 60%. The transmittance is preferably measured on a SHIMADZU UV-1700 pharma Spec UV-Visible spectrophotometer at 25°C with a wavelength of 600 nm.

- 10 Carboxylic acids (1) of the invention preferably provide a substituted or non-substituted alkyl chain comprising from 8 to 22 carbon atoms.

Preferred carboxylic acids (1) are chosen in the group consisting of: myristic acid, caprylic acid, capric acid, lauric acid, palmitic acid, stearic acid, oleic acid, 15 linoleic acid, arachidic acid, behenic acid, erucic acid, ricinoleic acid, elaidic acid, arichidonic acid, myristoleic acid, and mixtures thereof.

One or several carboxylic acids (1) of the invention may be used in the gel system.

20

Amine (2) may be then an alkoxyated alkyl amine or an alkoxyated alkenyl amine. Amine (2) is defined as a compound providing an amine function and one or more alkoxyated chain and one or more alkyl chain or alkenyl chain. Preferentially the amine function is a secondary or tertiary amine function.

25

Preferably the alkoxyated alkyl amine or alkoxyated alkenyl amine compounds also comprise at least one hydroxyl function.

Alkoxylated alkyl amine compound preferably comprises a linear or branched, alkyl chain comprising from 8 to 22 carbon atoms. Alkoxylated alkenyl amine compound preferably comprises a linear or branched, alkenyl chain comprising from 8 to 22 carbon atoms.

5

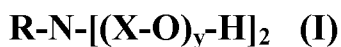
Preferably, the alkoxylated alkyl amine compound comprises at least one hydroxyl function and at least one alkyl chain comprising from 8 to 22 carbon atoms. The alkoxylated alkenyl amine compounds preferably comprise at least one hydroxyl function and at least one alkenyl chain comprising from 8 to 22

10

carbon atoms.

According to one embodiment of the present invention, alkoxylated alkyl or alkenyl amine (2) is a compound of formula (I):

15



wherein:

- R is selected from an alkyl or alkenyl group comprising from 8 to 22 carbon atoms

20

- X is an alkyl chain containing 1 to 4 carbon atoms; and

- y is 1, 2, 3, 4 or 5.

In the compounds of formula (I), R is preferably an alkyl or alkenyl group comprising from 12 to 22 carbon atoms, preferably a C₁₂-alkyl, C₁₂-alkenyl, C₁₄-alkyl, C₁₄-alkenyl, C₁₆-alkyl, C₁₆-alkenyl, C₁₈-alkyl, C₁₈-alkenyl, C₂₀-alkyl, C₂₀-alkenyl, C₂₂-alkyl and C₂₂-alkenyl. The number of carbons may be expressed as an average as alkoxylated alkyl or alkenyl amines may be derived from natural oils comprising a mixture of alkyl groups or alkenyl groups of

25

somewhat varying length. Alkyl or alkenyl chains may be derived from tallow, coconut oil, soybean oil, palm oil, palm kernel oil and mixtures thereof.

X is preferably ethyl. y is preferably 2.

5

Preferred alkoxyated alkyl or alkenyl amines of the present invention are chosen in the group consisting of: bis(2-hydroxyethyl) hydrogenated tallow amine, bis(2-hydroxyethyl) lauryl amine, bis(2-hydroxyethyl) coco amine, bis(2-hydroxyethyl) myristyl amine, bis(2-hydroxyethyl) palmitoyl amine,
10 bis(2- hydroxyethyl) stearyl amine, bis(2-hydroxyethyl) palm amine, bis(2-hydroxyethyl) palm kernel amine, bis(2-hydroxyethyl) tallow amine, bis(2-hydroxyethyl) oleyl amine, and mixtures thereof.

One or several alkoxyated alkyl or alkenyl amines may be used in the gel
15 system of the invention.

The weight ratio of carboxylic acid (1)/amine (2) in the gel system is preferably comprised between 3:1 and 1:3, more preferably comprised between 2:1 and 1:2.

20

Cationic surfactants (3) of the formulation may be used singly or in admixture.

Cationic surfactant of the present invention is preferably a quaternary ammonium material. Examples of right cationic surfactants of quaternary
25 ammonium types may be for example: ester quaternary ammonium, alkyl quaternary ammonium, amido quaternary ammonium, imidazoline quaternary ammonium, and ester amido quaternary ammonium.

Particularly preferred quaternary ammonium cationic surfactants comprises

at least one alkyl or alkenyl chain, having from 8 to 22 carbon atoms, connected to the nitrogen head group, possibly with at least one ester function and/or amine function.

5 Suitable cationic surfactants for use in hair conditioners of the invention include quaternary ammonium compounds such as cetyl trimethyl ammonium bromide (also known as CETAB or cetrimonium bromide), cetyltrimethylammonium chloride (also known as cetrimonium chloride), myristyl trimethyl ammonium bromide (also known as myrtrimonium bromide
10 or Quaternium-13), cetyl trimethyl ammonium chloride, stearyl dimethyl distearyldimonium chloride, dicetyl dimonium chloride, stearyl octyldimonium methosulfate, dihydrogenated palmoylethyl hydroxyethylmonium methosulfate, isostearyl benzyldimonium chloride, cocoyl benzyl hydroxyethyl imidazolinium chloride, dicetyl dimonium chloride and distearyldimonium
15 chloride; isostearylaminopropalkonium chloride or olealkonium chloride; behentrimonium chloride; coconut bis (2-hydroxyethyl) methyl ammonium chloride; stearyl bis (2-hydroxyethyl) methyl ammonium chloride; laurylamido propyl trimethyl ammonium methylsulfate; behenyltrimethylammonium chloride, cetylpyridinium chloride, tetramethylammonium chloride,
20 tetraethylammonium chloride, octyltrimethylammonium chloride, dodecyltrimethylammonium chloride, hexadecyltrimethylammonium chloride, octyldimethylbenzylammonium chloride, decyldimethylbenzylammonium chloride, stearyldimethylbenzylammonium chloride, didodecyldimethylammonium chloride, dioctadecyldimethylammonium
25 chloride, tallowtrimethylammonium chloride, cocotrimethylammonium chloride, and the corresponding hydroxides thereof.

The weight ratio of carboxylic acid (1)/cationic surfactant (3) in the gel system is preferably comprised between 4:1 and 1:4, more preferably comprised between 3:1 and 1:2.

- 5 The weight ratio of amine (2)/cationic surfactant (3) in the gel system is preferably comprised between 4:1 and 1:4, more preferably comprised between 4:1 and 1:2.

The compositions of the present invention may also comprise other
10 components such as surfactants, organic or inorganic thickeners such as hydroxyethyl cellulose, opacifying or pearlescent agents such as for example ethyleneglycol distearate, water-insoluble skin benefit agents, exfoliating particles, preservatives, antimicrobials, bactericides, antioxydants such as butylated hydroxytoluene, humectants, fragrances, colouring agents and
15 sequestering agents such as for example sodium salt of the ethylenediaminetetraacetic acid.

The humectants in the composition may be selected from glycerine, diols, triols and polyols. The composition may comprise from 0 to 10 % by weight of
20 humectants, based on the total weight of the composition.

The surfactants in the composition may be selected from any known anionic, cationic, nonionic and amphoteric/zwitterionic surfactants suitable for applications to the human body.

25

Preferably, the gel system of the invention is substantially free or, in some cases, completely free of silicone, such as dimethicone. As used herein, the term "substantially free" when used with reference to the absence of silicone in the gel system of the present invention, means that the gel system comprises

less than 0.1 % wt of silicone, based on the total weight of the gel system. As used herein, the term "completely free" when used with reference to the absence of silicone in the gel system of the present invention, means that the gel system comprises no silicone at all.

5

The gel system according to the present invention can be easily produced for example by melting and mixing at least components (1), (2) and (3), notably simultaneously or separately, notably by heating and thereafter cooling the mixture, for example at room temperature, such as 25°C.

10

The present invention also concerns a process to produce the gel system wherein at least the carboxylic acid (1), the amine (2) and the cationic surfactant (3) are mixed together, notably simultaneously or separately, under heating.

15

The gel system according to the present invention may notably be obtained by heating the carboxylic acid (1) and the amine (2) until they are molten, separately heating a cationic surfactant (3) in water until it is dissolved/suspended, then adding the molten carboxylic acid (1) and the amine
20 (2) mix to the cationic surfactant (3), notably before adding any remaining ingredients.

The examples provided here further describe and demonstrate embodiments of the present invention. The examples are given solely for the purpose of
25 illustration and are not to be construed as limitation of the present invention

EXPERIMENTAL PART

Compounds used in the formulations are the following:

- Ethyl fatty amine is hydrogenated tallow amine ethoxylate ether (2EO).
Fentacare HT02 from Rhodia
- 5 - Cationic surfactant is behenyl trimethylammonium chloride (BTAC).
BTAC 2231 from Rhodia

Example 1: Formulations

1. In a side beaker, heat the D.I. water up to 80 °C.
- 10 2. In the main beaker, add myristic acid, Fentacare HT02 and BTAC 2231,
use IKA mechanical overhead stirrer to stir at 50 rpm while heating up to
80°C. When the mixture is melt and becomes clear, pour the pre-heated
D.I. water in Step 1 into the main beaker, maintain the temperature of
80°C, stir at 1000 rpm for 2 minutes.
- 15 3. Remove heat, stir at 400 rpm to cool down the system.
4. When temperature is below 45°C, add Mackstat DM, stir for another 15
minutes, stop stirring and cool down to room temperature.
5. Discharge.

20 **Apparent Viscosity Measurement**

The apparent viscosity is measured on a Brookfield DV-II+ viscometer at 25°C,
10 rpm for 1 minute

Transmittance Measurement

- 25 Transmittance is measured on a SHIMADZU UV-1700 pharma Spec UV-
Visible spectrophotometer at 25°C with a wavelength of 600 nm.

Conditioning Effect Measurement (Dia-Stron Wet/Dry Combing)

The changes in the wet and/or dry combing attributes of hair resulting from treatment with shampoos, conditioners, styling aids or other active materials were measure using DIA-STRON MTT-170 (Miniature Tensile Tester) as follows.

Materials and Equipment:

- Dia-Stron MTT 170
- Dia-Stron software “UVWin 1.29.4000”
- 10 • IBM compatible computer and printer
- Hair tresses (2 grams, 6 inches long, net 1 inch wide, soft swatch – International Hair Importers, N.Y.)
- Coarse comb (4-tine/cm) for combing hair
- Fine comb (6-tine/cm) to be attached on Dia-Stron fixed arm
- 15 • Standard rinsing apparatus: tray filled with running water (temp ~ 25 – 40°C; flow-rate ~ 1.8L/min)

Experimental conditions: with the exception of pre-treatment and treatment of hair tresses, all procedures should be conducted in a humidity and temperature-
20 controlled room (60% relative humidity, 21-22°C)

Procedures to be carried out:

1. Pre-treatment of hair tresses / To remove residual conditioning agents and other impurities
- 25 2. Wet combing (sorting) / For sorting of hair tresses
3. Dry combing (untreated) / Base line of dry, untreated tresses
4. Wet combing (untreated) / Base line of wet, untreated tresses
5. Treatment of hair tresses with test shampoo, conditioners, styling aids or other active materials formulations

6. Dry combing (treated) / Effect of treatment and conditioning

7. Wet combing (treated) / Effect of treatment and conditioning

*Note:

5 1 hair tress = 10 combings

1 test sample= 3 hair tresses

3 hair tresses x 10 combings= 30 combings per test sample

Data Processing:

10 Conditioning Effect (Total Work Reduction) = (Treated Dry – Untreated Dry)/
Untreated Dry %

Conditioning Effect (Total Work Reduction) = (Treated Wet – Untreated Wet)/
Untreated Wet %

15 Conditioning Effect (Greatest Force) = (Treated Dry – Untreated Dry)/
Untreated Dry %

Conditioning Effect (Greatest Force) = (Treated Wet – Untreated Wet)/
Untreated Wet %

20 Results expressed in Tables 1 and 2 as follow demonstrate that formulations
Inv. 1-5 according to the invention provide the desired appearance and
conditioning effect while the other formulations are either lack of desired
conditioning effect or sufficient viscosity and transmittance.

Table 1

Formulations	Inv 1	Inv 2	Inv 3	Inv 4	Inv 5
(1) Acid (% by wt)	Myristic Acid (3.5)	Myristic Acid (2.8)	Myristic Acid (3.5)	Myristic Acid (3.5)	Myristic Acid (3.5)
(2) Amine (% by wt)	Hydroxyl ethyl fatty amine (5.0)	Hydroxyl ethyl fatty amine (4.0)	Hydroxyl ethyl fatty amine (2.0)	Hydroxyl ethyl fatty amine (3.5)	Hydroxyl ethyl fatty amine (5)
(3) Cationic surfactant (% by wt)	2.5	2.4	2.5	3.75	1.25
(4) Glycerine (% by wt)	-	3.0	-	-	-
(5) Water	To 100	To 100	To 100	To 100	To 100
Properties					
Gel obtaining	Yes and stable	Yes and stable	Yes and stable	Yes and stable	Yes and stable
Viscosity (cps)	40400	14200	12000	3900	22200
Transmittance (%)	8.5	5	7.0	13.0	12.0
Conditioning effect (%)	+46	+76	+83	+90	+92

Table 2

Formulations	Comp 1	Comp 2	Comp 3
(1) Acid (% by wt)	-	Myristic Acid (3.5)	Citric Acid (3.5)
(2) Amine (% by wt)	Hydroxyl ethyl fatty amine (5.0)	Stearyl Amine (5.0)	Hydroxyl ethyl fatty amine (5.0)
(3) Cationic surfactant (% by wt)	2.5	2.5	2.5
(4) Water	To 100	To 100	To 100
Properties	-	-	-
Gel obtaining	Yes and stable	Yes and Stable	No gel achievement, unstable and phase separation
Viscosity (cps)	25400	39600	100
Transmittance (%)	5	0	85
Conditioning effect (%)	-157	+ 54	+87

CLAIMS

1. Gel system comprising at least :

- (1) 1-10 % by weight of a carboxylic acid having an alkyl or alkenyl chain
5 comprising from 8 to 22 carbon atoms;
(2) 1-10 % by weight of an alkoxyated alkyl or alkenyl amine;
(3) 0.5-5 % by weight of a cationic surfactant; and
(4) water.

10 2. Gel system according to claim 1, wherein said gel provides an apparent viscosity comprised between 1000 and 100000 cps.

3. Gel system according to claim 1 or 2, wherein carboxylic acids are chosen in the group consisting of: myristic acid, caprylic acid, capric acid, lauric acid,
15 palmitic acid, stearic acid, oleic acid, linoleic acid, arachidic acid, behenic acid, erucic acid, ricinoleic acid, elaidic acid, arichidonic acid, myristoleic acid, and mixtures thereof.

4. Gel system according to anyone of claims 1 to 3, wherein the alkoxyated
20 alkyl or alkenyl amine compound also comprises at least one hydroxyl function.

5. Gel system according to anyone of claims 1 to 4, wherein alkoxyated alkyl or alkenyl amine compound is a compound of formula (I):



wherein:

- R is selected from an alkyl or alkenyl group comprising from 8 to 22 carbon atoms;

- X is an alkyl group containing 1 to 4 carbon atoms; and
- y is 1, 2, 3, 4 or 5.

6. Gel system according to claim 5, wherein R is an alkyl or alkenyl group
5 comprising from 12 to 22 carbon atoms.

7. Gel system according to claim 5 or 6, wherein X is ethyl.

8. Gel system according to anyone of claims 5 to 7, wherein y is 2.

10

9. Gel system according to anyone of claims 1 to 8, wherein alkoxylated alkyl
or alkenyl amines are chosen in the group consisting of: bis(2-hydroxyethyl)
hydrogenated tallow amine, bis(2-hydroxyethyl) lauryl amine, bis(2-
hydroxyethyl) coco amine, bis(2-hydroxyethyl) myristyl amine, bis(2-
15 hydroxyethyl) palmitoyl amine, bis(2- hydroxyethyl) stearyl amine, bis(2-
hydroxyethyl) palm amine, bis(2- hydroxyethyl) palm kernel amine, bis(2-
hydroxyethyl) tallow amine, bis(2- hydroxyethyl) oleyl amine, and mixtures
thereof.

20 10. Gel system according to anyone of claims 1 to 9, wherein the weight ratio
of carboxylic acid (1)/amine (2) in the gel system is comprised between 3:1 and
1:3.

11. Gel system according to anyone of claims 1 to 10, wherein the cationic
25 surfactant (3) is a quaternary ammonium material.

12. Gel system according to anyone of claims 1 to 11, wherein the weight ratio
of carboxylic acid (1)/cationic surfactant (3) in the gel system is comprised
between 4:1 and 1:4.

13. Gel system according to anyone of claims 1 to 12, wherein the weight ratio of amine (2)/cationic surfactant (3) in the gel system is comprised between 5:1 and 1:5.

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14. Gel system according to anyone of claims 1 to 13, wherein it comprises a humectant.

15. Gel system according to anyone of claims 1 to 14, wherein said gel system
10 is substantially free or completely free of silicone.

16. Process to produce a gel system according to anyone of claims 1 to 15, wherein at least the carboxylic acid (1), the amine (2) and the cationic surfactant (3) are mixed together under heating.

15

17. Process according to claim 16, wherein the gel system is obtained by:

- heating the carboxylic acid (1) and the amine (2) until they are molten,
- separately heating a cationic surfactant (3) in water until it is dissolved or suspended, then
- 20 - adding the molten carboxylic acid (1) and the amine (2) mix to the cationic surfactant (3).

18. Gel system susceptible to be obtained by mixing at least :

- (1) 1-10 % by weight of a carboxylic acid having an alkyl or alkenyl chain
25 comprising from 8 to 22 carbon atoms;
- (2) 1-10 % by weight of an alkoxylated alkyl or alkenyl amine;
- (3) 0.5-5 % by weight of a cationic surfactant; and
- (4) water.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/058992

A. CLASSIFICATION OF SUBJECT MATTER INV. A61K8/36 A61K8/41 A61Q5/12 A61K8/04 A61K8/45 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A61K A61Q		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2008/145579 A2 (UNILEVER PLC [GB]; UNILEVER NV [NL]; UNILEVER HINDUSTAN [IN]; MURRAY A) 4 December 2008 (2008-12-04) the whole document	1-18
X	----- EP 2 216 011 A2 (OREAL [FR]) 11 August 2010 (2010-08-11) the whole document -----	1-18
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents :		
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family	
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Donovan-Beermann, T	

INTERNATIONAL SEARCH REPORT

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