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(54) Title: COMPOSITION FOR A PASTY FILLER MATERIAL, PASTY FILLER, AND METHOD FOR PRODUCING A PASTY FILLER MATERIAL

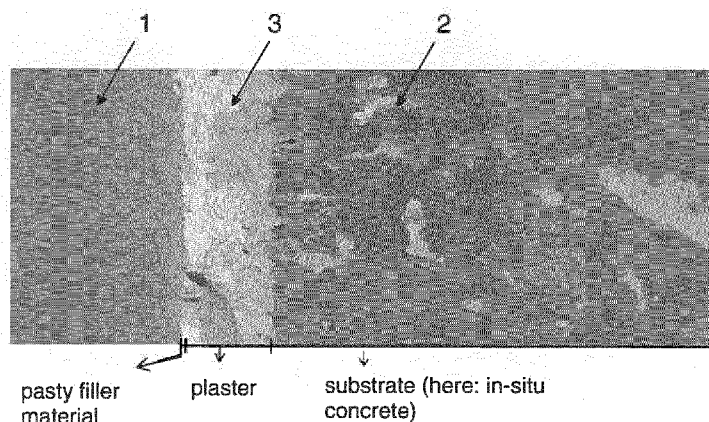


Fig. 2

(57) Abstract: The invention relates to a composition for a pasty filler material, comprising a binding agent, fillers, and additives, wherein the composition further comprises an additive consisting of a blend of liquid hydrocarbons, modified fatty acid derivatives, nonionic emulsifiers, and silicone oil; such a defoaming additive is e.g. known under the brandname Agitan 218. The invention further relates to a corresponding pasty filler material and a method for producing a pasty filler material.

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**Composition for a pasty filler material, pasty filler,
and method for producing a pasty filler material**

The invention relates to a composition for a pasty filler material, a pasty filler, and a
15 method for producing a pasty filler material according to the respective independent
claims.

In prior art, basically two types of fillers are known for filling joints or for being applied
to surfaces, such as walls, in order to smooth out unevenness and to additionally
20 function as primer layer for another layer to be applied thereon. Namely, on the one
hand, there are powder fillers, and on the other hand, there are pasty fillers, which
have the advantage that they are ready to use whereas powder fillers have to be
mixed with water before use. Pasty fillers compared to powder fillers have the further
advantage that besides being able to be used without any addition of water or other
25 materials, they can be stored over months without their processing characteristics
being modified or deteriorated.

A polymer binder, for example, polyvinyl acetate, polyethylene vinyl acetate,
polyacrylate, and/or polyvinyl alcohol are employed, either as aqueous dispersion or
30 as re-dispersible powder. The binders have the function to bind the components of
the filler material and to adhesively bond the filler to the substrate, like a wall or the
like.

As filler particles, nodular and lamellar materials are used which usually are of
35 mineral origin. The filler particles form the framework or skeleton of the coating and,

thus, contribute to the layer thickness and sink characteristics depending on the amount of filler material added. A main filler material is natural calcium carbonate or calcium magnesium carbonate (dolomite).

5 As additives, thickening agents and biocides are usually used. Thickening agents may be cellulose based additives, as hydroxypropylmethyl celluloses and hydroxyethyl celluloses which have the effect that the viscosity of the filler is maintained constant, and which ensure a constant processability when stored over a time period of up to one year.

10

Biocides are added in order to prevent bacterial contamination, and finally, fungicides are added for preventing fungal infestation.

15

The majority of pasty filler materials is applied manually, for example, by means of a trowel. If needed, the person using the filler material adds water for facilitating and improving the processability.

20

With increasing mechanization with respect to processing of chemical building products, pasty filler materials which can be used in processing machines have been developed. Specifically, in this respect, spray filler materials have been developed which can be applied to a surface with a layer thickness of 3 mm at a maximum, and which act as a substrate for further subsequently applied layers, as wall paint or wall papers.

25

However, spray fillers on a mineral basis known from prior art have the following shortcomings: When applying the pasty material by spraying, usually the method of hydraulic atomization or "airless application method" is employed. However, a key requirement for the airless application is that a homogeneous pasty material requires a reduced shear stress once it's being moved through the spray nozzle during spraying. Therefore pasty spray fillers have to be accordingly prepared prior to being applied to a surface or joint by mechanical homogenization which effects a shear thinning. This additional procedure leads to a substantial increase of the total processing time.

30

Further, in pasty spray fillers known from prior art as well as plaster materials usually organic components are implemented in order to ensure their mechanical workability. The use of organic components, however, usually involves emissions and odor nuisance which restricts the use of such products with respect to indoors. Moreover,
5 organic components are critical with respect to fire behavior.

Pasty spray fillers should have the function to level unevenness of a surface so as to provide a homogeneous surface for further coatings, for example, decorative coatings. Many pasty fillers which are extremely well suited for being used in
10 mechanical spraying devices, are either not able to provide this compensating function such that additional processing steps are necessary, or entail the above mentioned disadvantages with respect to odor and emissions, or poor fire behavior.

As described in US 6,545,066 in particular lightweight pasty fillers contain spherical
15 silicate products, like micro perlite, for reducing the specific weight of the final product and provide an increased surface area yield of the product. Lightweight pasty fillers tend for several days or weeks to (post-) thickening and to the generation of air bubbles after storage. The generation of air bubbles and the thickening causes problems during the machine application, in particular with the "airless application
20 method".

Finally, in cases where lightweight pasty filler materials are used as substrate layers for subsequent decorative coatings, products having a very high brightness and a high drying capacity have to be employed.
25

Therefore, it is an object of the present invention, to provide a composition for a pasty filler material which can be easily machine-processed and provides good crack and shrinkage resistance. It is also an object of the present invention to provide a corresponding pasty filler material, and a method for producing such a lightweight
30 pasty filler material. Advantageously, the filler material is lightweight providing handling and application advantages as well as output efficiency (more square meters per kg).

This object is solved by a composition for a pasty filler material comprising a binding agent, fillers, and additives, wherein the composition further comprises 0.1 to 0.4 % by weight of an additive consisting of a blend of liquid hydrocarbons, modified fatty components, especially modified fatty acid derivatives, nonionic emulsifiers, and
5 silicone oil. Preferred embodiments of the invention are defined in the respective dependent claims.

The inventive composition provides a pasty filler which can be used without any additional processing or preceding preparation steps, in particular in airless spraying
10 applications. Such a pasty filler can be easily manually processed and provides good crack and shrinkage resistance. Additionally, since it uses an additive consisting of a blend of liquid hydrocarbons, modified fatty acid derivatives, nonionic emulsifiers, and silicone oil an excellent workability of the filler over a long time period is ensured. The aliphatic hydrocarbon components of this additive have an anti-foaming/venting
15 effect. Thereby, air bubbles generated during storage of the filler material are removed.

Finally, the aliphatic hydrocarbons improve the flow characteristics of the sprayable filler material. This allows for implementing a continuous material transport, for
20 example, an airless method without a mechanical homogenizing before the application. In general this allows achieving a high application thickness.

According to a preferred embodiment of the invention the liquid hydrocarbons are selected from the group consisting of saturated hydrocarbons with the general
25 formula C_nH_{2n+2} , where $n = 5$ to 15 and cycloalkanes, composed of 5 and/or 6 member rings with the general formula C_nH_{2n} , and mixtures thereof. The saturated hydrocarbons comprise straight or branched carbon chains or both.

Preferably, the modified fatty acid compounds are selected from the group consisting
30 of fatty acid ester, fatty alcohols, alkoxyates, polyglycol-ethers, fatty acids, and mixtures thereof.

As the non-ionic emulators compounds selected from the group consisting of fatty alcohols, cetyl alcohol, stearyl alcohol, cetostearyl alcohol, oleyl alcohol , and mixtures thereof can advantageously be used.

- 5 The silicon-oil is preferably selected from the group consisting of liquid polymerized siloxanes with alternating silicone-oxygen atoms and organic side chains. The side chains are attached to the tetravalent silicon centers comprising alkyl and phenyl groups and mixtures thereof.
- 10 According to the present invention, in a composition for a physically drying pasty filler material, the binders are polymer binders can be selected from the group consisting of polyethylene vinyl acetate, polyacrylate, and polyvinyl alcohol, or any combination thereof.
- 15 Preferably, the polymer binders are added to the composition as aqueous dispersion or as re-dispersible powder.

According to a further preferred embodiment of the invention, the fillers are selected from the group consisting of calcium carbonates, calcium magnesium carbonates,
20 calcium sulfates, and lamellar siliceous materials, or any combination thereof.

Preferably, the composition comprises 40 to 70 % by weight of the fillers.

It is also advantageous, if the lamellar siliceous materials comprise kaolin of the illite
25 group. Specifically preferred, kaolin and spherical calcium aluminum silicate are comprised in the composition in a ratio of 1 : 2. The lamellar siliceous materials preferably depict a platelet shape.

In another preferred embodiment of the present invention, the composition comprises
30 1 to 4 % by weight of palygorskite. This also offers the above described effect of a particularly even and homogeneous surface structure.

Preferably, the composition comprises perlite to reduce the weight for providing the lightweight pasty filler material. In one particular example, the composition comprises 2 to 40 % by weight of expanded perlite (e.g. micronized and/or expanded perlite).

5 Micronized expanded perlite are those having a mean particle size d_{98} of lower than 200 μm , preferably lower than 100 μm . The mean particle size is determined by making linear intercepts of the grain boundaries. Especially, the mean particle size d_{50} is between 20 to 80 μm ; preferably between 40 to 50 μm .

10 According to yet a further preferred embodiment of the invention, the composition further comprises modified celluloses and biocides as additives.

The modified celluloses may be selected from the group consisting of hydroxypropylmethyl celluloses and hydroxyethyl celluloses. Moreover, it is
15 preferred, if the composition comprises 0.1 to 0.7 % by weight of the hydroxypropylmethyl celluloses and/or hydroxyethyl celluloses.

The biocides may be added to the composition on a basis of 2-methyl-2H-
isothiazoline-3-on (MIT) and 2-bromo-2-nitropopane-1.3-diol (BNPD).

20 It is also preferable, if the composition comprises 0.1 to 1 % by weight of biocides.

Further, according to another preferred embodiment, the composition comprises 0.01 to 0.03 % by weight of fungicides which are added to the composition on a basis of
25 isopropynyl butylcarbamate (IPBC).

According to the present invention, also a pasty filler, in particular physically drying spray filler, which is made from the above specified composition is provided. The inventive filler provides the advantages already described above in connection with
30 its composition.

Preferably, the specific weight of the pasty filler is below 1.2 kg/l. In particular preferred it is below 1 kg/l. This pasty filler is considered as a lightweight pasty filler.

According to a further preferred embodiment of the present invention, a layer thickness of 1 to 3 mm immediately after application will shrink to layer thicknesses of 75 % up to 85 % after drying.

5 The present invention also provides a method for producing a pasty filler, in particular also a lightweight pasty filler as specified above. The method is based on a two-stage process, according to which in a first step, dry components are homogenized, and in a second step, the homogenized dry components are added to aqueous or water-dilutable components. By the inventive method, a pasty filler having the above
10 described advantages can be provided.

Preferably, the first and second steps of the two-stage process may be carried out in parallel for more than 80% of the processing time. Thus, the parallel processing saves processing time, and thus renders the method more economical.

15

The resulting pasty filler generally can be applied by all methods known from the state of the art, e.g. by aid of mechanic tools or by machine processing. The machine processing is preferred.

20 Further details and features of the invention will become clear from the following description in connection with the drawing in which

Fig. 1 shows a photograph of a surface with a coating of the pasty filler material according to an embodiment of the present invention, before and after a
25 smooth finish with a trowel; and

Fig. 2 shows still another photograph of a coating of the pasty filler material according to an embodiment of the present invention; and

30 Fig. 3 shows an illustration of a card house structure of lamellar filler particles in an inventive embodiment of a pasty filler material.

Fig. 1 shows a photograph of a surface with a coating of the pasty filler material 1 according to an embodiment of the present invention, before and after a smooth

finish with a trowel, wherein the indicated upper rectangular area displays a surface immediately after spray application of the filler, whereas the lower rectangular area displays a finished surface which has been additionally smoothed by means of a trowel. The application of the spray filler has been carried out means of a hydraulic atomization process, namely, an airless method. For this, either a piston pump or a spiral pump may be used. Usually, the use of a piston pump is preferred, because when using the latter, an even and uniform material application with high throughput can be achieved. In practice, the material is sprayed onto a surface with an even spraying cone. By this, a surface having a uniform texture is obtained which afterwards may be smoothed out by means of a wide trowel so as to obtain the finished coating.

Fig. 2 shows still another photograph of a coating of the lightweight pasty filler material 1 according to an embodiment of the present invention which in contrast to the example shown in Fig. 4 has been applied onto a surface made from in-situ concrete 2 which at first has been coated with a plaster layer 3. Here, only one application for a new coating with the lightweight pasty filler material 1 may be sufficient, however, two coatings each of which having a layer thickness below 3 mm is preferable.

Fig. 3 shows an illustration of a card house structure. Since kaolin has a plate-shaped morphology, due to the charge distribution, a card house structure can be formed by the platelets to level out defect sites in the surface to be coated and to reach a high application layer thickness without the filler material slipping off the substrate.

An characterization of the lightweight pasty filler composition for a lightweight pasty filler material 1 according to an embodiment of the present invention compared to an example of a composition known from prior art is shown in the table provided below.

Raw material	Chemical description of raw material	Example from prior art	Examples for lightweight pasty filler material compositions according to the present invention		Possible range for filler compositions according to the present invention
			% by weight	g	% by weight
Dolomite powder 90 μ m	Carbonate	10 – 50	850,00	43,95	10 – 70
Minugel FG	Palygorskite	0.2 – 10	22,70	1,17	0,2 – 10
Mica-Celia 125	Muscovite mica	2 – 6	75	3,88	2 – 6
Sil-Cell 35.34	Micronized expanded perlite	2 – 40	81,50	4,21	2 – 40
Cellosize QP 52000	Hydroxyethyl-cellulose (HEC)	0.1 – 0.8			
Walocel MK 25000 PFV	Hydroxypropyl methylcellulose (HPMC)		6,30	0.33	0.1 – 0.8
Emset KH 6	modified starch		6	0.31	0.1 – 1
K-Flex DP	Oxydipropydi-benzoat	0.1 – 0.5			
Agitan 218	blend of liquid hydrocarbons, modified fatty acid derivatives, nonionic emulsifiers, and silicone oil		4	0.21	0.1 – 0.4
Vinnamul 3171 N	Ethylen vinylacetate copolymer (EVA)	0.5 – 5	75,00	3,88	0.5 – 5
Biocide	2-methyl-2H-isothiazolin-3-on (MIT) and 2-bromo-2-nitropropan-1,3-diol (BNPD)	0.1 – 1	3	0.16	0.1 – 1
Water	Water	20 – 55	810,00	41,89	20 – 60
Polyphase PW 40	3-Iodo-2-propynyl butylcarbamate (IPBC)	0.02 – 1	0.30	0.02	0.01 – 0.03
Total batch kg			1933,80	100,00	

A lightweight pasty sprayable filler material having a composition according to the present invention provides for a homogeneous substance which still has comparably low shear stress at high shear rates.

5

Claims

1. Composition for a pasty filler material (1), comprising a binding agent, fillers, and additives, wherein the composition further comprises 0.1 to 0.4 % by weight of an additive consisting of a blend of liquid hydrocarbons, modified fatty acid derivatives, nonionic emulsifiers, and silicone oil.
10
2. Composition according to claim 1, wherein the fillers are selected from the group consisting of calcium carbonates, calcium magnesium carbonates, calcium sulfates, and lamellar siliceous materials, or any combination thereof.
15
3. Composition according to claim 2, wherein the lamellar siliceous materials comprise kaolin of the illite group.
4. Composition according to any one of claims 1 to 3, wherein the composition comprises 1 to 4 % by weight of palygorskite.
20
5. Composition according to any one of claims 1 to 4, wherein the composition comprises perlite.
- 25 6. Composition according to claim 5, wherein the composition comprises 2 to 40 % by weight of perlite, especially micronized and expanded perlite with a mean particle size d_{98} of less than 200 μm .
- 30 7. Composition according to any one of claims 1 to 6, wherein the liquid hydrocarbons are selected from the group consisting of saturated hydrocarbons with the general formula C_nH_{2n+2} , where $n= 5$ to 15 with straight or branched carbon chains and cycloalkanes composed of 5 and 6 member rings with the general formula C_nH_{2n} , and mixtures thereof.

8. Composition according to any one of the claims 1 to 7, wherein the modified fatty acid compounds are selected from the group consisting of fatty acid ester, fatty alcohols, alkoxylates, polyglycol-ethers, fatty acids, and mixtures thereof.
- 5
9. Composition according to any one of the claims 1 to 8, wherein the non-ionic emulators are selected from the group consisting of fatty alcohols, cetyl alcohol, stearyl alcohol, cetostearyl alcohol, oleyl alcohol, and mixtures thereof.
- 10
10. Composition according to any one of the claims 1 to 9, wherein the silicon-oil is selected from the group consisting of liquid polymerized siloxane with alternating silicone-oxygen atoms and organic side chains, wherein the side chains are attached to the tetravalent silicon centers comprising alkyl and phenyl groups and mixtures thereof.
- 15
11. Composition according to any one of claims 1 to 10, wherein the composition further comprises modified celluloses, starches, biocides, or fungicides as additives.
- 20
12. Composition according to any one of claims 11 to 13, wherein the starches are modified starches, especially starch ether modified with alkylene oxides with the general formula $C_nH_{2n} + 1 O$, where $n = 2$ to 5 .
- 25
13. Pasty filler, in particular physically drying spray filler, which is made from the composition according to any one of claims 1 to 12.
- 30
14. Method for producing a pasty filler, in particular a pasty filler according to claim 13, wherein the method is based on a two-stage process, according to which in a first step dry components are homogenized, and in a second step, the homogenized dry components are added to aqueous or water-dilutable components.

15. Method according to claim 14, wherein the first and second steps of the two-stage process may be carried out in parallel for more than 80% of the processing time.

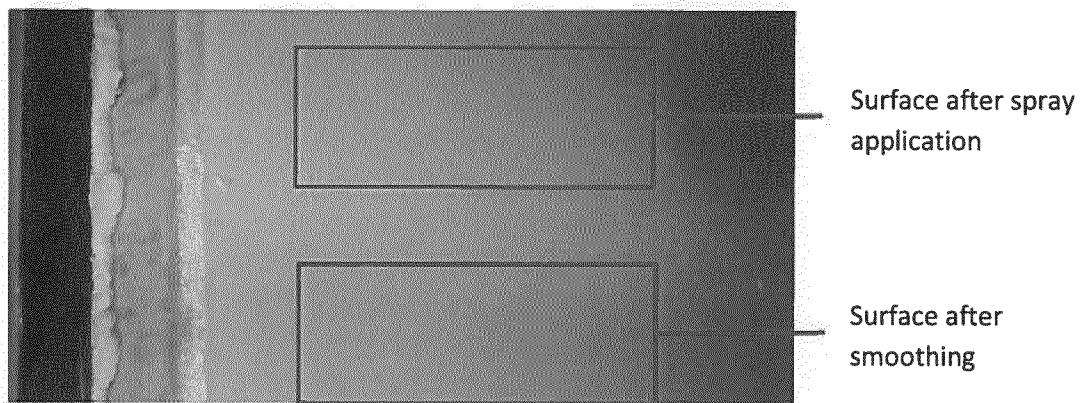


Fig. 1

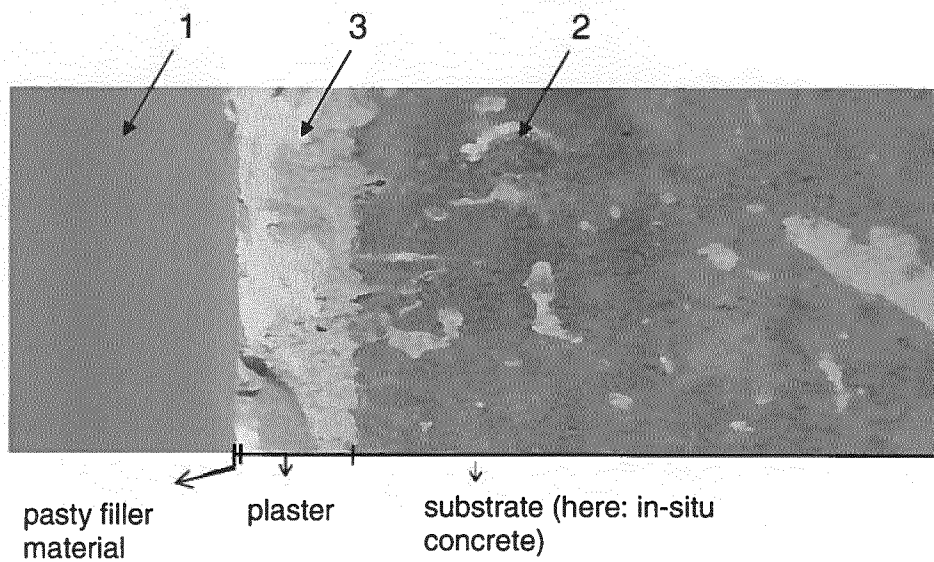


Fig. 2

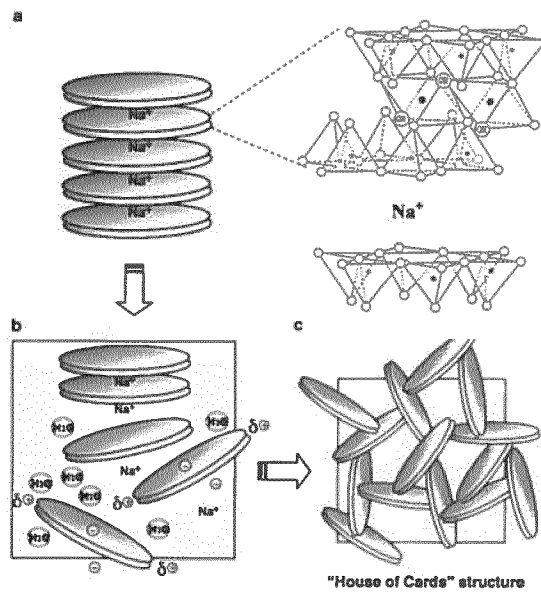


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
 INV. C04B26/04 C04B26/06 C04B40/00
 ADD. C04B111/00

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)
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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

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A	abstract column 8, line 53 - line 60 column 10, line 16 - column 11, line 29 claim 1	1-13
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
3 November 2015	11/11/2015

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 Kolb, Ulrike
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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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Information on patent family members

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