Abstract Title: **Paint binder compound**

A paint binder compound that is combined with various other materials to produce a non-toxic dry powder paint that may be subsequently mixed with a variety of liquids and applied as paint to achieve different surface finishes, textures and appearances together with the method for making the same. The binder material is formed from a blend of casein protein, soy lecithin, dextrin and cellulose fibres.
Title: Paint Binder Compound

Background:

This invention relates to the fields of architectural or decorative coatings and paints in general and, more particularly, to binders within non-toxic paints in dry powder form and methods for making the same. Even more particularly the present invention relates to such binders within a dry powder paint formulation as will combine with a variety of liquids to achieve a range of different surface finishes, textures and appearances.

Typically conventional paints are produced in liquid form and comprise a binder (a 'glue-like' material), fillers, pigment and solvent packaged within a metal or plastic container. Generally the ingredients comprise petroleum and synthetic chemicals and solvents that are combined with bactericides, surfactants and other additives, many of which are deemed hazardous to human health, the environment and the atmosphere. The presence of such materials has been linked to a range of serious pathological conditions and emissions can continue without noticeable signs for a considerable period after the product has been applied. Evaporation of the solvents within conventional paints can also cause shorter term distress to both humans and animals and is felt to be a trigger for headaches, migraines, breathing difficulties, asthma attacks and other health conditions.

It is also estimated that between 10-12% of conventional liquid paint products end up in the waste stream without being used for a variety of reasons including consumer confusion over applicability, purchase of too much product and unsuitability of purchased paint for a particular finish.

Additionally the manufacture, transportation, storage and disposal of such conventional liquid paint products poses additional hazards for producers, distributors and users of such products. Regulations are planned to limit the amount of toxic chemicals and solvents in such products and UK environmental landfill regulations now increasingly restrict the disposal of liquid paints and their containers by both professional painters and householders.

Even liquid paints advertised as 'low VOC' and/or 'non-toxic to humans' may still contain solvents, bactericides and other ingredients harmful to the atmosphere, environment and other life forms, such as aquatic.

In addition the increasing diversity of paint colours, surface applicability and finishes necessitates the consumer making additional purchases of paint products with the resulting increase in disposal and waste stream. The costs of safely disposing of some liquid paint ingredients are now estimated to be in the order of ten times the cost of manufacture.

Consequently there is a need for a non-toxic paint that does not contain undesirable ingredients and does not constitute a health hazard for
humans, the environment and the atmosphere and which preferably has none of the disposal problems associated with conventional liquid paints.

It has long been known that tolerable non-toxic paints can be produced from a range of minerals and natural materials in a dry powder form to be mixed by the user with water in the amounts required at time of use. These paints, often include milk, in liquid or other forms, and are of ancient origins. Such dry-powder paints, wherein the binder is the most critical component, have been variously referred to as milk paints; casein paints; casein-lime distempers; calcimines; etc. A number of formulations for such dry powder paints have been granted patents in various countries over a period of many years and these have been reviewed in pursuance of this application.

Although produced in dry powder form, these paints still require a considerable degree of skill in the art to produce satisfactory results. For example the resulting liquid mix can be liable to agglomeration of the casein granules producing a porridge-like and grainy texture. A blotchy and inconsistent colour finish can also result from insufficient combination of the binder with the pigment material. The mixing of such paints can also produce excessive foaming, resulting in a mousse-like consistency that cannot be applied satisfactorily with normal tools.

Additional problems can occur when applying such paints over certain surfaces including previous coats of conventional acrylic, or other petrochemical paints, as well as mixed material substrates such as gypsum, acrylic plasters and lime mortars. This can result in the rejection of the paint entirely, or cracking and flaking.

Another salient drawback is that the finish of such paints is often limited to a flat matt appearance, which can be loose and rub off easily. This flat matt appearance can also restrict the applicability of such paints necessitating the use of other incompatible and hazardous products within the same location, thereby negating the benefits of non-toxic products.

Therefore there is an unaddressed need for a modern form of non-toxic dry-powder paint material that can be easily mixed with a variety of liquids by those of little prior skill to produce durable, attractive and varied finishes and appearances that is suitable for application to a wide range of surfaces and substrates.

Furthermore such paint would be advantageous to users and others if it's packaging and any residues could be easily disposed of without any detrimental impact on the environment, atmosphere, humans and other life forms.

Description of Invention

To address this need the present invention proposes a binder compound which is formulated and manufactured to be combined with a variety of fillers, pigments and additives to produce a non-toxic dry-powder paint
which will combine satisfactorily with a range of liquids to produce durable, attractive and varied paint finishes and appearances on a range of surfaces and substrates.

Generally the binder of the present invention is made up of components that include a casein protein, a starch-based sugar such as dextrin and other materials and techniques that have become more recently available such as soy lecithin, cellulose fibres and the process of micronising milling. To produce the said binder compound, the four principal components are provided in specific quantities and are mixed and processed prior to inclusion with other ingredients of a non-toxic dry powder paint. Although these are four of the ingredients, other components that are compatible with these four may be added if desired.

I have found that soy lecithin acts beneficially upon the chemical reaction between the casein protein and its activating material, believing it to break down the fat components within the casein and reducing its propensity to agglomerate and clump when mixed with water.

I have found that cellulose fibres reduce the tendency of the final paint product to separate run and splatter when applied to vertical or horizontal surfaces with normal paint application tools.

I have found that dextrin increases the dispersion and adherence of the pigment component in application of the paint and reduces any initial rubbing off of the paint product prior to the curing of the paint product through evaporation and carbonisation.

I have found that the performance of the overall paint produced is measurably enhanced when the said binder components are mixed, ground to micron fineness and heat treated prior to inclusion with other components of a dry-powder paint.

I have found that such binder may be used in various proportions with other materials to produce a dry powder paint that combines satisfactorily with a range of liquids to produce an acceptable quality of paint which produces, or can be caused to produce, different surface finishes, appearances and textures after drying.

I have found that such binder when combined with said other materials to form a dry-powder paint are capable of indefinite storage in a wide range of moisture proof packaging without noticeable degradation or loss of performance.

I have found that such binder when combined with said other materials to form a dry-powder paint has no known detrimental impacts on the environment, atmosphere, human or other life and will biodegrade over time.
Typical Composition of the proposed invention:

80-90% by weight casein protein powder
5-10% by weight dextrin powder
2-5% by weight soy lecithin
2-5% by weight cellulose fibres

Procedure:

Weigh and mix all components in a container. Subject the mixture to a series of grinding and sieving processes until all are intimately mixed and ground to a size of between 3-20 microns.

Place mixture in a suitable vessel where a temperature of between 200-250 degrees centigrade can be maintained for a period of between 2 to 6 hours.

Cool and combine the resultant compound with other components of a dry-powder paint in various proportions according to the consistency and nature of the pigment.

Advantages of this invention:

The inclusion of said binder compound in a dry-powder paint formulation enables users of little skill in the art to produce a paint product that is advantageous over both conventional liquid paint and other dry-powder paints in respect of:

- Homogenous smooth mix that has the expected consistency of paint
- Ability to combine with a wide variety of liquids including oils, waxes, glues to produce a satisfactory paint product with different characteristics for different finishes and surfaces
- Better adhesion to a variety of surfaces and substrates
- Less paint ‘splatter’ or ‘runs’ when applied to vertical surfaces
- Colour is consistent over large areas without blottiness
- Coverage density and area is consistent with conventional paint
- No noxious fumes or apparent ill affects to users or household
- Dries within 1-2 hours and rooms can be reused immediately
- No need for separate primer or undercoat prior to application on most surfaces
- No need for additional products to produce matt, eggshell, silk and semi-gloss finishes on a wide variety of surfaces.
- Fast clean up with plain water with no need for special solvents
- Residues are biodegradable and can be safely composted with normal garden materials.
Claims:

What is claimed is:

1. A specific paint binder compound to be included in a non-toxic dry-powder paint, such binder compound principally comprising casein protein, soy lecithin, dextrin and cellulose fibres together with the procedure for making such compound and for combining such compound with other materials to produce said non-toxic dry powder paint.
2. A paint binder compound according to claim 1 further compromising a preservative and fungicide including, but not restricted to, zinc oxide and potassium sorbate.
3. A paint binder compound according to claim 1 further compromising an anti foaming ingredient such as, but not restricted to, silica sand.
4. A paint binder compound according to claim 1 further compromising a dispersant including, but not restricted to, polysaccharide substances.
5. A paint binder compound according to claim 1 which is combined with a filler mixture containing, but not restricted to, kaolin, magnesium silicate, calcium carbonate in various forms to produce a dry powder paint.
6. A dry powder paint according to claim 5 further compromising a binder activating material such as, but not restricted to, calcium hydroxide, ammonium carbonate and borax.
7. A dry powder paint according to claim 5 further compromising pigments selected from a group containing, but not restricted to, organic and inorganic pigments, ochres, oxides, dioxides, umbers, vegetable dyes and other naturally occurring earth pigments.
8. A dry powder paint according to claim 5 wherein 15 to about 30% of said dry powder paint is binder compound.
9. A dry powder paint according to claim 5 wherein 50 to about 70% of said dry powder paint is filler materials.
10. A dry powder paint according to claim 5 wherein 0.5 to about 20% of said dry powder paint is pigment material.
11. A dry powder paint according to claim 5 wherein 1 to about 10% of said dry powder paint is activating material.
12. A dry powder paint according to claim 5 wherein 0.5 to about 2% of said dry powder paint is preservative material.
13. A dry powder paint according to claim 5 wherein 0.05 to about 1% of said dry powder paint is dispersant material.
14. A method of manufacturing said specific binder compound for use in manufacturing the said dry powder paint comprising the steps of: providing casein protein, providing soy lecithin, providing dextrin; providing cellulose fibres and combining and subsequently grinding to a fineness of between 3 to 20 microns and heating such compound to a temperature of between 200-250 degrees centigrade for a period of time not less than 2 and not more than 6 hours.
15. A method of manufacturing said dry powder paint comprising the steps of: providing said specific binder compound; providing filler
mixture; providing pigment; providing preservative; providing anti-foaming materials; providing dispersant and mixing thoroughly for a period of not less than 10 and not more than 20 minutes and subsequently grinding to an overall fineness whereas the finished material will pass through a mesh containing 200 holes per square inch.

16. The said dry powder paint containing the said specific binder compound which can then be combined with a variety of liquids, singly or in combination, that include, but are not restricted to: water; beeswax emulsion; other wax emulsions; gums; glues; linseed oil; safflower oil; sunflower oil; tung oil; and by thorough mixing create a liquid paint which can be applied to a variety of surfaces and which upon drying will appear, or can be caused to appear, to have differing surface finishes, appearances and textures.
Application No: GB0620800.3
Claims searched: 1-16
Examiner: Mr Jason Scott
Date of search: 25 January 2008

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

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| A        | -                  | US 2636829 A  
SHERWIN WILLIAMS See document teaching casein based paints. |

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Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC:

Worldwide search of patent documents classified in the following areas of the IPC
C08L; C09D

The following online and other databases have been used in the preparation of this search report
WPI, EPDOC, TXTE

International Classification:

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