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ABRASIVE SCOURING POWDER

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The present invention relates to an improvement in abrasive scouring powders, whereby the keeping qualities, rinsability, abrasive and detergent properties thereof are substantially and unexpectedly increased. My invention also effects a substantial reduction in the cost of manufacture of the product. Such products generally comprise an abrasive material and an alkaline detergent as the chief constituents. A soap or soap-like material comprises an optional third ingredient.

Considerable difficulty has been experienced in the past in the storage or keeping qualities of abrasive scouring powders due to their tendency to form a relatively hard mass or cake, on standing, particularly in localities having relatively humid or hot atmospheric conditions. Furthermore, and probably due to the fact that the abrasive material ingredient of abrasive scouring powders is an insoluble, silica-containing material such as silica flour, volcanic ash, tripoli, powdered feldspar, pumice, pumicite and the like, difficulty has been encountered in rinsing or washing the material from the surface to which it has been applied. Another problem presented in the manufacture and use of abrasive scouring powders is the control and selection of the sharpness or abrading power of the abrasive. The abrasive functions to scrape or scratch dirt and soil loose from the surface being cleaned.

Great care must be exercised in the preparation and selection of the abrasive material, lest it be found to be too sharp and too hard so as to scratch or gouge the surface in addition to merely removing the dirt and soil.

When soap or a soap-like material is added to an abrasive scouring powder, it functions to prevent the dirt and soil abraded loose from the surface to be cleaned from re-adhering to that surface, as well as adding sudsing properties to the powder. The soap or soap-like material may consist of either animal or vegetable oil soaps, resin soaps, blended soaps, soap powders, saponin, or the so-called wetting or sudsing agents, which are, the salts of sulphonated or sulphated organic compounds of high molecular weight which have the property of decreasing the surface tension of their aqueous solutions and causing foaming or sudsing. The cost of the soap or soap-like material is considerably higher than that of the two other primary ingredients of the abrasive scouring powder. Hence, a reduction in the amount of soap or soap-like material required without sacrifice in the properties imparted to the scouring powder by its presence, becomes economically desirable.

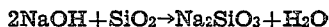
I have discovered that bentonite, when added to an abrasive scouring powder, imparts unusual and unexpected results towards curing the above-mentioned difficulties.

I have found that by adding as little as one-tenth of 1% bentonite to this class of product that the keeping qualities and rinsability are greatly improved, a sharper abrasive may be used, and the bentonite may be substituted for an equal amount of soap-like material. Also, bentonite has very valuable detergent properties, particularly when a product containing it is used for removing such types of soil as pencil marks or carbon stains from tile, porcelain, glass, or painted surfaces.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described, and particularly pointed out in the claims, the following description setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

Now, bentonite, which is a mineral clay having colloidal properties, has previously been used as a filler for soap and abrasive pastes and liquids. Such use of bentonite involved its previously known property of forming a gelatinous mass when mixed with water. I have discovered a new and additional property of bentonite, namely, its ability to prevent caking, hardening and setting of a powdered, technically dry mixture of silica-containing abrasive and alkali metal salt detergent material.

It is well known that silica and alkali metal hydroxides have a strong affinity to react with each other, even in the technically dry state. Such reaction is represented by the following chemical equation:



The alkaline detergent materials used in an abrasive scouring powder comprise chiefly the alkali metal carbonates, borates, silicates and phosphates, and usually the sodium salt thereof, such as sodium carbonate, sodium bicarbonate, borax, tri-sodium phosphate, sodium silicates and sub-silicates, trona and the like. It is not known precisely whether these alkali metal salts used in abrasive scouring powders as the alkaline detergent material undergo a direct chemical reaction with the silica to produce silicates which have a cementing action tending to glue the particles of silicate together, or form a cake-like and hardened mass with the silica directly. Furthermore, it is not precisely known whether the silica and the alkaline material, rather than undergoing a chemical reaction, merely absorb moisture from the atmosphere or from water of hydration present in the materials, to effect a hydraulically cementing action of the mass. Perhaps it is a combination of these two indicated effects which has heretofore produced the diffi-

culty of hardening and caking a mixture of silica-containing abrasive and alkali metal salt detergent material. Conditions of relatively high atmospheric temperatures and/or humidity promote this undesired result.

The addition of bentonite in dry powdered form to the technically dry, powdered mixture of silica-containing abrasive and alkaline material forming the basic ingredients of abrasive scouring powder, counteracts this hardening and caking tendency. The amount of such bentonite addition occurs in a critical range, being from $\frac{1}{8}$ of 1% to 5%. Above this range, the addition of bentonite provides no appreciable enhancement in the desired effect.

I am unable to ascribe any exact scientific theory or principle to this new, above-described property of bentonite. It is possible, however, that the bentonite acts as an insulating medium between the particles of silica and the alkaline material, preventing a chemical reaction or physical agglomeration thereof, and possibly also absorbs any atmospheric or inherent moisture in the powder, which would otherwise effect a cementing action.

I have also discovered that such addition of bentonite remarkably improves the rinsability of the abrasive scouring powder. This effect is all the more unusual and unexpected when it is considered that the addition of bentonite to a powdered abrasive, such as silica flour alone, has no such effect. Mixtures of bentonite and silica flour rinse only with great difficulty, and the time of rinsing increases as the concentration of bentonite is increased.

As a further incident to my invention, I have also discovered that the amount of soap or soap-like material, when it is used in abrasive scouring powder, can be reduced or, in effect, partially displaced by the bentonite addition, and without sacrificing the cleaning and sudsing properties of the soap or soap-like material. The bentonite, in itself, thus also acts to assist in the cleaning function of the scouring powder. The addition of the bentonite to the abrasive scouring powder has been found to impart an additional advantage, namely, that of "cushioning" the abrasive material. It is obvious that the abrasive or dirt-scraping action of the abrasive scouring powder will be relatively more effective in proportion to the hardness and sharpness of the particles of abrasive material. However, if too hard and sharp an abrasive is used, it will not only scratch the dirt from the surface to be cleaned, but it will necessarily go the next step further and remove and damage that surface. Careful control and selection of the properties of hardness and sharpness of the abrasive material used in the scouring powder is, hence, required. But it has been found that due to the "cushioning" action of bentonite, that the disadvantages incident to any want of such selection or control are eliminated. The bentonite thus has the effect of tempering the action of an abrasive in the scouring powder which is too "rough."

On the other hand, if the abrasive, in order to avoid too great a hardness or sharpness, is ground to a relatively fine size, the cost of production of the abrasive scouring powder is not only increased, but the fine dust-like particles of abrasive might prove irritating and injurious to the user, particularly, if inhaled into the respiratory system. Here again, the addition of bentonite

according to the principle of my invention, in permitting the use of a coarser ground and "non-dusting" abrasive, overcomes and eliminates still further disadvantages previously encountered in the art of manufacturing abrasive scouring powder.

The addition of bentonite also imparts the physical characteristic to the abrasive scouring powder when it is in the dry form, in that it has the characteristic feel, when coming in contact with the human hands, of being smooth, soft and silky. When the abrasive scouring powder embodying my invention is mixed with water, and hence, in the wet form, it has the desired creamy characteristics of feel and appearance and is not slimy or gritty.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such be employed.

I, therefore, particularly point out and distinctly claim as my invention:

1. A substantially non-caking abrasive scouring powder, comprising a silica-containing abrasive selected from the group consisting of silica flour, volcanic ash, tripoli, feldspar, pumice and pumicite and an alkali metal salt selected from the group consisting of alkali metal carbonates, bicarbonates, borates, silicates and phosphates, said abrasive and said salt forming a relatively hard, set mass or cake when normally mixed in technically dry, powdered form and subjected to atmospheric conditions of relatively high humidity and temperature, and 0.1 to 5% of bentonite present to counteract such cake-forming capacity.

2. A substantially non-caking abrasive scouring powder, comprising soap, a silica-containing abrasive selected from the group consisting of silica flour, volcanic ash, tripoli, feldspar, pumice and pumicite, and an alkali metal salt selected from the group consisting of alkali metal carbonates, bicarbonates, borates, silicates and phosphates, said abrasive and said salt forming a relatively hard, set mass or cake when normally mixed in technically dry, powdered form and subjected to atmospheric conditions of relatively high humidity and temperature, and 0.1 to 5% bentonite present to counteract such cake-forming capacity.

3. A substantially non-caking abrasive scouring powder, comprising silica flour and an alkali metal salt selected from the group consisting of alkali metal carbonates, bicarbonates, borates, silicates and phosphates, said silica flour and said alkali metal salt forming a relatively hard, set mass or cake when normally mixed in technically dry, powdered form and subjected to atmospheric conditions of relatively high humidity and temperature, and 0.1 to 5% bentonite present to counteract such cake-forming capacity.

4. A substantially non-caking abrasive scouring powder, comprising soap, silica flour and an alkali metal salt selected from the group consisting of alkali metal carbonates, bicarbonates, borates, silicates and phosphates, said silica flour and said alkali metal salt forming a relatively hard, set mass or cake when normally mixed in technically dry, powdered form and subjected to atmospheric conditions of relatively high humidity and temperature, and 0.1 to 5% bentonite present to counteract such cake-forming capacity.

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