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NONDUSTING SOAP COMPOSITION AND METHOD FOR MAKING SAME

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7 Claims. (Cl. 252—368)

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The present invention relates to a process of treating soap in particulate form to minimize dust and/or to reduce the tendency of the soap to lump in use. More particularly, the invention relates to a process of applying to spray-dried soap particles a water-soluble organic material having a non-tacky character at normal room temperatures, and to the coated product.

Soap preparations have been employed for many years, both in industrial and in domestic use in particulate form; for example, spray-dried soaps, granulated soaps, soap powders, soap chips, etc. Because of the large exposed surface area, soaps in this form possess certain advantages over soap in massive form such as bars or cakes, a principal advantage being rapid solubility in water. There have been, however, some disadvantages associated with soaps in particulate form. One disadvantage is that these soaps contain varying amounts of extremely fine particles. Some of the fines are incidental to the manufacture of the soap in particulate form and others result from the breakdown of larger particles in handling, packaging, shipping, etc. Some of the fines are so small that they float in the air as dust when the soap is shaken in its container or poured from the container. This dust is objectionable not only because it represents a waste of the soap but also because it is irritating to the mucous membranes causing sneezing, running of the eyes and nose and other discomforts. Another disadvantage of soaps in particulate form is that when they are poured onto the surface of water, particularly heated water, lumps or agglomerates form which are very difficult to break up and dissolve in the water. This tendency is particularly evident in spray-dried soaps.

It has now been discovered that by applying to the surface of soap particles a water-soluble organic material that has a non-tacky character at normal room temperatures the foregoing disadvantages are overcome or greatly reduced.

Generally speaking, the process of the present invention comprises applying to the surface of soap particles a solution of a water-soluble organic material that will form a dry film or skin upon removal of the solvent and drying the applied material.

The soap particles treated in accordance with my invention may be made of various compositions, e. g., sodium soaps of fatty acids, with or without fillers, builders, emulsifiers, including mineral oil, etc., and may be formed in any suitable manner, e. g., by granulating framed or milled soap; by drum drying soap solutions to

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form flakes, chips and like forms; by spray drying soap solutions, etc. Spray-dried particles in the form of beads, i. e., soap which has been sprayed under such conditions as to form one or more voids within the particles of soap, are particularly susceptible to the formation of lumps when the soap is poured onto hot water.

A satisfactory method of applying the coatings in accordance with the present invention comprises spraying an aqueous solution of the organic material on the soap particles, preferably with the aid of agitation, and drying the sprayed particles, i. e., removing sufficient water from the sprayed material to bring the surface of the particles to substantially non-tacky or dry condition.

The organic coating material preferably is soluble or dispersible in water. Using such material, soap particles can be completely surrounded by a film of the coating material without preventing the soap from dissolving in water. The mechanism of lumping is not completely understood but it is believed that the rapid absorption of water by the fines present in spray-dried soaps produces a gel that agglomerates larger particles into a lump that is broken up only with difficulty and which does not dissolve readily in the water. By treating the particles of soap in accordance with the present invention, the fines small enough to form dust apparently become agglomerated together and to the larger particles whereby dust is practically eliminated. The rate of solution of the fines, and probably of the larger particles also, is believed to be retarded sufficiently by the coating to allow the soap to spread over the surface of the water before the gel can form. Regardless of the accuracy of this theory, however, it has been found that by treating soap particles with a water-soluble organic material in accordance with the present invention, dust is practically eliminated and the tendency of the treated particles to agglomerate into lumps when the soap is poured into hot water is greatly reduced. The treated product is sometimes referred to in the specification as "coated" with the organic material. This definition should not be narrowly construed as requiring a film surrounding each of the particles but broadly to cover the particles on which the organic material has been deposited as described herein. Among the materials that can be used in accordance with the invention are various starches, such as corn starch, water-soluble starch, dextrine, etc.; gums, such as gum tragacanth, karaya, quince seed, Chinese shavings, etc.; and glues from plant and

animal sources. These water-soluble organic materials preferably are applied in the form of an aqueous solution. The term "solution" is used in this specification not only to include true solutions but also colloidal solutions and suspensions.

Various methods of agitating the soap particles so that at least a major portion of the surface of the particles is exposed to the spray may be used. One method that has been found satisfactory is to spread the soap particles out on a flat surface which is then shaken or vibrated to cause the particles to change position. Another method is to cause soap particles to flow down an inclined surface or to cascade through the air and simultaneously to spray them with the organic solution. A preferred method for large scale operations is to spray the soap in a drum which is rotated at sufficient speed to cause particles to tumble during the spraying operation. Spray-dried particles may also be coated in the tower in which they are formed or in a separate tower by causing them to fall through a mist or fog of the organic material.

The organic material may be sprayed on the soap products simultaneously with the agitation or the spraying and agitating steps may be carried out alternately with any desired number of repetitions.

In most cases, it will be necessary to dry the coated particles after the spraying operation to evaporate the solvent in which the organic material was dissolved. Any suitable method of drying may be employed; for example, the coated particles may be spread out in a thin layer to dry in the air or, where they are coated in revolving drums, they may be satisfactorily dried by continuing the rotation of the drum after the spraying operation either with or without forced circulation of air through the drum. Where water is used as the solvent, it is desirable in some cases to dry the soap particles to lower moisture content than desired in the final product and to apply the organic material in just enough water to bring the moisture content to the desired level. The absorption of the moisture from the sprayed coating in such case dries it to the desired non-tacky condition.

The following examples are given to illustrate the principles of the present invention, and it will be understood that the invention is not limited to the use of the apparatus, procedure and materials employed in the illustrative examples.

Example I

Soap particles are formed by spray drying a hot aqueous solution of about 70% sodium soaps of fatty acids and 30% soap builders. The spray-dried product, containing about 10% moisture, is composed largely of hollow beads but it contains fines that form a cloud of dust when the soap is poured or shaken. A quantity of the spray-dried product is spread out on a flat surface to form a thin layer which is sprayed with a 1% aqueous solution of a water-soluble starch. The particles are agitated by shaking the supporting surface and sprayed again. The total quantity of starch on a dry basis that is sprayed onto the soap particles amounts to about 0.1% by weight of the soap. The coated soap particles are dried while spread out thin until the coating becomes non-tacky. A quantity of the dried coated product is poured into water at a temperature of about 145° F. where it disperses and dissolves with reduced tendency to form objectionable lumps as compared with untreated material.

Example II

500 parts by weight of a spray-dried product of substantially the same composition as Example I are placed in a rotatable drum having an opening in one end. The drum is rotated at a sufficient speed to cause good tumbling of the soap particles. 13.7 parts by weight of a 5% aqueous solution of corn starch are sprayed on the tumbling soap particles and the rotation of the drum is continued for about five minutes after the spraying ceases. A portion of the coated product is placed in a glass jar and shaken vigorously. Practically no dust is observed in the jar above the coated product.

Screen analyses of the spray-dried product before and after being coated as described are set forth in the following table, the amounts being per cent by weight:

Mesh	As Received	Coated
On No. 12	0	0.4
On No. 20	1.5	8.0
On No. 40	45.8	45.6
On No. 60	36.0	31.3
On No. 80	9.7	8.9
On No. 100	3.0	2.7
On No. 200	3.1	2.7
Thru No. 200	0.8	0.3

It will be seen from the foregoing table that the percentage of material smaller than 40-mesh is reduced by the coating operation. That portion of the soap passing through a 200-mesh screen contains the fines which form objectionable dust, but not all of the material passing a 200-mesh screen is fine enough to produce dust. his is demonstrated by the foregoing dust test. When the spray-dried soap is shaken in a glass jar prior to treatment, a noticeable cloud of dust can be seen above the soap particles in the jar, whereas this dust cloud is absent when the coated product is tested in the same manner.

Example III

500 parts by weight of spray-dried soap of substantially the same composition as Example I are sprayed in a rotating drum as described in Example II with 25.6 parts by weight of a 0.5% aqueous solution of gum tragacanth. The sprayed material is spread out in a thin layer and dried. An arbitrary lumping test was set up for comparing the tendency of the material to lump before and after treatment. In this test, 15 grams of the material to be tested are poured upon the surface of a liter of water at 50° C., allowed to stand one minute and then vigorously stirred for ten seconds. The resulting mixture is poured through a 10 x 10 screen, the foam blown away and the material retained is weighed in its wet condition. The weight of retained material, which is taken as an index of the lumping tendency, is at least about 40% greater in the case of untreated soap particles than in the case of soap particles treated as described. The coated material also contains practically no dust.

The amount of the organic coating material applied to the soap particles may vary over a wide range. Since it is a surface coating, small amounts of the order of about 0.01% on a dry weight basis give significant improvement in dust reduction. Relatively large amounts of the order of about 5 to 10% may be used, but when more than about 1% is used, there is no signifi-

cant additional improvement due to such excess quantities in minimizing dust or in reducing tendencies to lump. Preferably about 0.1% to 0.5% on a dry basis is used. The concentration of the solution of the organic material may vary widely. It is preferable to use such a concentration that the solution has good spraying and spreading properties but not so dilute as to add sufficient water to cause solution of the soap particles in applying the desired amount of organic material. The use of excess water, moreover, is wasteful of the heat required to dry the coated product to the proper moisture content.

While the organic material in the foregoing examples is dissolved in water for application by spraying, other solvents such as aqueous alcohol, aqueous acetone, etc., may be used if desired. Other materials may also be included in the solution; for example, a mineral oil such as kerosene may be emulsified in the aqueous solution of the organic material and sprayed on soap particles as described above. In this manner, a small percentage of the mineral oil can be very uniformly distributed on the surface of the particles of soap where it assists in further reducing dust and the tendency to lump. If desired, perfume material may be added at the same time as the coating material.

Although the present invention has been described and illustrated in connection with certain specific embodiments, it will be understood that modifications and variations within the scope of the following claims are contemplated.

I claim:

1. A process which comprises spraying on soap particles an aqueous solution containing material from the class consisting of starch, gum and glue, and drying the sprayed particles to non-tacky condition.

2. A process which comprises spraying on soap particles with the aid of agitation an aqueous solution containing material from the class consisting of starch, gum and glue, and drying the sprayed particles to non-tacky condition.

3. A process which comprises subjecting a mixture of soap beads and fines to agitation, spraying said mixture with an aqueous solution containing material from the class consisting of starch, gum and glue, the amount of said material sprayed being within the range of about 0.01% and 10% by weight of the soap, and drying the sprayed material to free-flowing condition.

4. A process which comprises subjecting a mixture of soap beads and fines to agitation, spraying said mixture with an emulsion of mineral oil in an aqueous solution containing material from the class consisting of starch, gum and glue, and drying the sprayed material.

5. As a new article of manufacture, soap particles coated with material of the group consisting of starch, gum and glue.

6. As a new article of manufacture, a non-dusting, free-flowing particulate soap comprising spray-dried soap particles including beads and fines having a dry coating of material from the group consisting of starch, gum and glue.

7. As a new article of manufacture, soap particles having deposited on their surface a coating containing mineral and material selected from the group consisting of starch, gum and glue.

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Certificate of Correction

Patent No. 2,456,437. December 14, 1948.

GILBERT DE WAYNE MILES

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 4, line 38, for "his is" read *This is*; column 6, line 25, claim 7, after the word "mineral" insert *oil*;

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 17th day of May, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.