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WASHING COMPOUND

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Our invention relates to a washing compound intended to be employed in the washing machine or wash-tub along with the soapy water in which clothes are ordinarily washed, the washing compound serving the double function of whitening the clothes and softening the water, the form of the compound being such as to be attractive to the housewife, convenient to handle, and efficient in use.

An object of our invention is to provide a washing compound for use in the washing machine or tub which imparts to the wash water a blue color.

Another object of our invention is to provide a washing compound which softens the water in which it is used.

Another object is to provide a washing compound, the constituents of which are not substantially altered in contact with hot soapy water.

Another object is to provide a washing compound in the attractive form of blue crystals.

A further object of our invention is to provide a washing compound incorporating a blue water-soluble dye constituent on the exteriors of water-soluble crystals in order that all of the dye may be dissolved almost immediately upon contact with water.

Still another object of our invention is to provide a washing compound which is cheap and easy to manufacture.

Our washing compound comprises crystals of a water-softening agent carrying a suitable blue dye. As water-softening agent we prefer to use borax (sodium tetraborate), but other water-softeners such as tri-sodium phosphate or sodium carbonate may be substituted. The blue dye is preferably carried by the crystals on their exteriors, although it may be distributed throughout the crystals if desired.

Our washing compound is put into the wash water in the washing machine or wash-tub in which clothes are to be washed, and is preferably dissolved therein prior to putting in of any soap in order that the water-softening agent may have opportunity to act upon the hard and undesirable constituents of the water before any soap has been required to be used up in combining with these hard constituents. The washing compound may, however, be added after the soap has been put in, with no harmful effect.

Assuming that the washing compound is dissolved first, the soap is added and dissolved in the usual manner, except that less soap will be required by the amount saved through action of the water-softening agent. Immediately upon dissolving the washing compound, the water will

be colored blue and will remain so throughout the washing, which is done in the usual manner. No blueing need be added in the rinse water as a superior blueing action is effected by the washing compound in the washing machine.

The function of the blue dye in the washing compound is two-fold. First, it is to neutralize the color of dirt in the wash water. As the washing proceeds, the wash water becomes dirtier and dirtier, and if it were not neutralized by other coloring would result in very imperfect washing. For as the dirty wash water passed into and through the clothes being washed it would simply substitute one batch of dirt for another. Common dirty water has a brownish color which, however, can be neutralized or converted into a gray by the addition of a suitable blue dye. For reasons to be presently set forth, it is desirable that the water in the washing machine be definitely blue at all times, and therefore sufficient blue dye is employed to more than neutralize the dirtiest water found during the wash. Besides the real advantage of not washing with a dirty brown water, there is the psychological effect on the housewife, in washing with blue water, that the water looks clean even though it actually contains a great deal of dirt. As the dirt in the wash water increases, the color simply changes from a bright blue to a darker grayish blue, but is never brown or dirt-colored. This function, it should be noted, can obviously not be performed by any blueing introduced into the rinse water.

The second function of the blue dye in the wash water arises from the fact that it is almost impossible to get every bit of dirt out of a fabric, even after prolonged washing. Very fine particles of dirt will be found to be entrained in the fibres of cloth so deeply that soap and water cannot effectively reach them to dislodge them. This causes white goods to appear yellow after long use. When clothes are washed in water containing a suitable blue dye, some of the dye remains in the surface layers of the cloth after rinsing and acts like a light filter causing a somewhat dirty white cloth to appear neutral in color or, as the housewife says, "white." Inasmuch as the inclusion of dirt changes the color of any cloth of whatever original color, and the superposition of blue neutralizes the dirt color, it will be seen that our washing compound is equally effective in restoring the natural color of any colored fabric as well as white ones.

In order to perform these functions in the environment stated, the dye employed must fulfill certain requirements. First, it must be blue in

color in order to neutralize the color of dirt. It is found that a greenish blue dye is most effective in restoring the natural color to cloth and is a bright, fresh appearing color in the washing machine. For these reasons, this hue is preferred. The dye employed must not be affected in color by soap solution, for it is to be used in the washing machine together with the suds. It is preferable that the dye be inert to dilute alkaline solutions such as sodium carbonate and sodium hydroxide solutions because household soaps often contain these substances. The dye should be inert to the water-softening agent with the crystals of which it is associated. The dye is also preferably one which has a low affinity for cotton or does not dye cotton directly in a dilute alkaline solution. The action of the dye on silk and wool is not so important because these fabrics are seldom washed in the washing machine with the dirty cotton goods, although it is desirable that the dye used should have a relatively slight affinity for these fabrics as well.

The following is intended to amplify this statement as to the direct action on fabrics of the most preferable dyes. All dyes, if used in sufficiently high concentrations, stain to some degree all fabrics soaked therein; but some dyes have relatively a very low affinity for certain fabrics, such as cotton—such a low affinity that special dyeing methods must be employed to dye these fabrics commercially with these dyes. This is what we mean when we say that the most preferable blue dye in our washing compound does not dye cotton directly in dilute alkaline solution, and has a low affinity for cotton. The desired action of the dye on the cotton is such that after saturating the fabric, almost all the dye can be easily washed out again. It is not absolutely necessary that we employ a dye of this character because we can use a blue dye which does dye cotton directly but use it in very low concentrations. This, however, has the disadvantage that if a few crystals of the washing compound were added to the wash while clothes were in the machine, the crystals might dissolve directly in contact with the clothes and permanently stain them in the regions of high dye concentration near the dissolving crystals.

In general, acid dyes have been found most suitable. Specifically, we prefer to use greenish blue acid dyes of a class which are salts of a sulfonic acid of substituted diamino triphenylcarbinol. One of the dyes in this class which we may use is identified by Colour Index No. 712 in the volume "Colour Index" published by the Society of Dyers and Colourists, 1924, and is sold as Alphazurine G, or National Soap Blue G, and Alphazurine 2G by the National Aniline and Chemical Co.; and as Liquid Soap Blue 243 by Interstate Color Co., New York city; and we believe as Neptune AG by the United Chemical Products Co., of Los Angeles, Calif. Another and closely related suitable dye of the same class is that identified by Colour Index No. 714 in the volume "Colour Index", and sold as Alphazurine A by the National Aniline and Chemical Co. Another dye of the above-named class which we may use is identified by Colour Index No. 671 in the volume "Colour Index" and is sold as Alphazurine FG by National Aniline and Chemical Co. Another dye product of the above-named class which we may use is Alphazurine B, sold by the National Aniline and Chemical Co. Another acid dye product of an entirely different

class from that named above which we may use is Alizarine Sapphire Blue G, sold by the Ciba Co. The above-mentioned dyes No. 712, No. 714, No. 671, are salts of a sulfonic acid of substituted alkylamino triphenylcarbinol. Dyes of this class are of particular value for use in wash water because they are inert to boiling soap solutions, and have their greatest absorption to visible light in the orange and red portion of the spectrum, at wave lengths greater than 6000 angstroms. It is in this region of the spectrum that soap and dirt transmit light the best. Thus these dyes are particularly efficient in neutralizing the color of soap and dirt remaining in fabrics. "Colour Index" gives the following wave lengths as corresponding to the points of greatest absorption: No. 712—6380 angstroms; No. 714—6364; No. 671—6390.

We prepare our washing compound as follows: When borax is used as the water-softening agent, borax crystals are first formed by crystallizing borax from a water solution by means of crystallizers well known in the chemical engineering art or in the manner we shall now describe. Each 8 pounds of 20 Mule Team borax or its equivalent is dissolved in about 1 gallon of boiling water. The solution, when clear, is poured off into pans and allowed to cool in the air whereupon beautiful transparent crystals of borax will form on the bottoms of the pans. The liquor above is poured off and reheated with more borax to form another batch of crystals, and so on. The wet crystals are centrifuged or are dried to remove only the water clinging to their surfaces and are broken up and preferably screened to pass through a 14 mesh screen and to be retained on a 40 mesh screen. The breaking of the crystals can be done prior to removing the free water from their surfaces. The crystals, when properly prepared, are sparkling clear and transparent. These crystals preferably contain from 40% to 50% of water of crystallization. The dye to be used is dissolved in water to form a very concentrated solution. A small amount of this dye solution is poured into a body of the dry borax crystals and the crystals are tumbled to thoroughly and uniformly distribute the dye over their exterior surfaces. To uniformly cover all the surfaces of the crystals without introducing any unnecessary excess of water it is found that a volume of about 11 cubic centimeters of dye solution should be mixed with each pound of crystals and the quantity of dye in this 11 cc. of solution is made whatever amount is desired to accompany one pound of the crystals in the finished compound. After the dye solution has thoroughly coated all the crystals, the mixture is either stirred and ventilated or is passed through a low temperature drier to simply remove the free water but not the water of crystallization. There is so little free water that this step can consist simply of air drying for a period of a few minutes. The result is a body of uniformly blue, translucent, sparkling crystals that attract the eye, and this quality forms one of the important elements of utility of the product.

If the crystals carrying the blue dye are dried sufficiently to remove a large share of the water of crystallization they become opaque and light blue in color, and while they may be used in this form, they are not regarded as being so attractive as the translucent crystals.

The relative proportions of borax and blue dye vary, depending upon how large a quantity of borax it is desired to provide for one washing, and

also upon the character and strength of the particular dye product employed. We have tabulated below the quantity of each dye which, if used alone in the washing compound, we prefer to mix with each one pound of borax crystals:

	Grams
5 Soap Blue G (National Aniline and Chem. Co.)	1.2
10 Liquid Soap Blue 243 (Interstate Color Co.)	2.25
Neptune Blue AG (United Chem. Prod. Co.)	1.4
Alphazurine A (Nat. Aniline and Chem. Co.)	2.4
15 Alphazurine B (Nat. Aniline and Chem. Co.)	1.0
Alizarine Sapphire Blue G (Ciba Co.)	1.2

Of the finished washing compound made according to these specifications, about 40 grams are preferably used to each washing machine full of wash water, this amount of water being about 18 gallons in an average machine. When a wash includes particularly dirty clothes, more of the washing compound is used.

25 It will be understood that various changes and modifications may be made in the proportions and composition of the product and the preferred method of its manufacture as described herein

without departing from the spirit and scope of the invention as defined by the appended claims.

We claim:

1. A washing compound comprising crystals of a water-softening agent carrying a blue water-soluble dye inert to boiling soap solution and having its greatest absorption to visible light at a wave length greater than 6000 angstroms. 5
2. A washing compound comprising crystals of borax carrying a blue water-soluble dye inert to boiling soap solution and having its greatest absorption to visible light at a wave length greater than 6000 angstroms. 10
3. A washing compound comprising crystals of a water-softening agent carrying a dye identified by Colour Index No. 712 in the volume "Colour Index." 15
4. A washing compound comprising crystals of borax carrying a dye identified by Colour Index No. 712 in the volume "Colour Index." 20
5. A washing compound comprising translucent crystals of borax, and a dye uniformly distributed over the exteriors of said crystals, said dye being identified by Colour Index No. 712 in the volume "Colour Index." 25

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