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LAUNDRY IDENTIFICATION

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In commercial laundries it is the present practice to identify laundry articles by employing laundry marking machines with the use of fairly permanent black ink and then after the completion of all of the laundry operations, effecting a redistribution of said articles into customers' bundles by reference to said mark.

In some instances such markings are objectionable because they permanently disfigure the laundered articles and this has resulted in the employment of detachable tabs for certain classes of laundry articles upon which the identification marks are placed. There are certain objections to the use of said tabs.

The object of my invention is to provide an ink, of inexpensive character, which may be used in connection with said marking machine, or otherwise, and which contains a normally invisible substance which will be carried by the pressure of the marking machine, or by the fluidity of the ink, and caused to deeply penetrate the fibers or spaces between the fibers of the fabric being marked, and which will have such characteristics that during the various steps of a laundry operation sufficient quantities of the substance of said ink will be retained therein after the completion of the laundry operation, which remaining substances are normally invisible, or at least not visible to any objectionable extent, but which may be made plainly visible by subjecting the marked portion of the article to the action of radiant energy, such for instance as that supplied by an ultraviolet lamp, and whereby the use of said detachable tabs on various classes of laundry articles may be dispensed with and whereby a maximum accuracy in laundry identification work may be attained.

My invention consists in the combination of substances containing a normally invisible substance that becomes visible when subjected to the action of radiant energy and which ink when applied to a fabric will cause a reaction and produce within and between the fibers of the fabric a solid precipitate, which because of the fact that it has been produced within and between the fibers of the fabric, will become fixed therein sufficiently to withstand the action of a laundering or dry cleaning operation, and thereafter may be made sufficiently visible under the action of radiant energy for purposes of identification.

I have obtained satisfactory results by the use of an ink consisting of a solution of zinc chloride, in which is contained approximately one tenth of one percent manganous sulphate, or similar activator, and stamping with this solution upon the

laundry article which has previously been moistened with sodium silicate. It is also possible to first moisten with zinc chloride containing one tenth of one percent manganous sulphate, and then stamp with a solution of sodium silicate. The reaction between these two compounds produces within and between the fibers of the fabric a solid precipitate of zinc silicate; which zinc silicate, because of the fact that it has been produced within and between the fibers of the fabric, will withstand a laundering, or a dry cleaning process; and which zinc silicate, because of the fact that it contains a small amount of a manganous, or similar compound, becomes sufficiently luminescent under the action of the radiant energy herein described, for purposes of identification.

This zinc silicate becomes firmly fixed within and between the fibers of the fabric because of the fact that certain of the spaces within and between the fibers of the fabrics have relatively small openings, which openings are smaller in cross sectional area than the crystals formed within these openings. These openings within and between the fibers of the fabric are irregular in outline and hence after the crystallization of the substance therein they, or some of them, become firmly fixed by mechanical entanglement or otherwise in said openings and cannot be removed by laundering or dry cleaning.

In practice I first moisten the laundry article with a solution of sodium silicate, then apply the solution of zinc chloride, which contains approximately one tenth of one per cent of manganous sulphate or similar activator, to the ink pad of a marking machine and stamp the previously moistened article with this solution of zinc chloride.

In place of the formula heretofore specified and containing sodium silicate and zinc chloride, I may, as a substitute for said formula, employ the following formulas: Calcium chloride and trisodium phosphate, strontium chloride and trisodium phosphate, barium chloride and trisodium phosphate, calcium chloride and sodium sulphate, strontium chloride and sodium sulphate, barium chloride and sodium sulphate, zinc chloride and sodium fluoride.

In every case it is necessary to activate one or the other of the solutions. This may be done as follows: By the addition of .01% to .1% of a manganous, cupric, thorium, thallium, uranium, or similar compound. Or, in the case of the cadmium tungstate, the one solution, this may be

activated with manganous salts, copper salts, rubidium salts, or similar activators.

In some instances it is desirable that the operator of the marking machine be able to inspect the mark when it is being placed on the laundry article. For that purpose I mix with my solution of zinc chloride a small amount of a substance such as prussian blue, of the sort commonly used for bluing operations in laundry practice, which substance leaves a visible, non-indelible mark.

In practical use I first moisten the laundry articles to be marked and identify with one or the other of the liquid solutions by means of a spray, or vapor, or liquid, containing said solution, and then apply the other solution to the laundry marking machine in the same manner as is now customarily employed with the black ink. When these two solutions unite within and around the fibers of the fabric, they react and form a solid or semi-solid substance which becomes fixed therein by mechanical entanglement or otherwise. Then the laundry articles are subjected to the ordinary laundering operations or dry cleaning operations, including heat, such, for instance, as in the ironing operation. During said laundering operations the objectionable foreign matter and soil is removed from the laundry article, and at the same time there is removed any objectionable or normally visible matter contained in the ink, and a sufficient amount of the normally invisible substance which is capable of being made clearly visible on the application of radiant energy is retained within and around the fibers of the article so that when the article is subjected to the action of radiant energy, such, for instance, as that from the violet ray lamp, the identification mark becomes plainly visible to the operator.

When there is added to my improved ink a normally visible substance, such as indigo, the operator of the marking machine is enabled, under ordinary conditions, to see the mark as it is being printed, and thus determine whether or not there is a sufficient amount of ink being properly applied to the laundry article.

I have found, however, that in most instances it is not necessary to supply this normally visible substance in the ink because, after the same laundry article has been repeatedly marked by the laundry, it is necessary or desirable that the marking machine operator place the mark upon a part of the article which does not contain a previous mark of the same normally invisible character, and for this reason I have found it desirable that there be installed at each marking machine an ultra violet ray lamp having a sufficient amount of energy to enable the operator to see any previous normally invisible marks that may still be carried by the laundry article, so that the new mark may be placed upon a part of the article not previously occupied by any other normally invisible mark.

I have found that, with my improved ink, a very large percentage of all of the articles that go to a commercial laundry may be thus identified. On some of the articles of black or very dark color the amount of radiant energy applied to the mark to cause it to become visible must be greatly increased over that necessary for making the mark visible on white or light colored laundry articles, and with certain of said laundry articles of dark color I preferably identify them

by the use of tabs detachably connected thereto, on which tabs may be printed the same identification mark as on the other laundry articles of a customer's bundle.

With my improved ink I have been able to overcome the main objections to laundry identification operations, and specifically the objection that the laundry identification marks in permanent black ink deface the laundry articles, because of my improved ink there may be numerous laundry identification marks on the article which do not deface it because they are normally invisible, and otherwise unobjectionable.

Furthermore, with my improved marking ink all of the objections to the use of detachable tabs, insofar as their probable injury to the laundry articles or the laundry machinery is concerned, have been removed.

I claim as my invention:

1. An improvement in the art of invisible identification of fabrics which consists in separately applying to the fabric two liquid components of an ink, one of which is applied in the form of the desired identification mark, said components having such characteristics that when thus united within a fabric the reaction between these two components will result in the formation of a substance normally invisible but which will become luminescent or otherwise visible under the action of radiant energy, and which substance is of such character that when thus applied to a fabric it will become so fixed within or between the fibers of the fabric as to withstand a laundering or dry cleaning process.

2. An improvement in the art of laundry marking which consists in first applying to a laundry article fabric one solution and later applying to the same laundry article another solution in the form of a laundry identification mark, said solutions having the characteristics that when united in and around the fibers of a fabric they will so react as to form a solid or semi-solid substance which becomes fixed in and around the fibers of the fabric by mechanical entanglement or otherwise, said solutions also containing a substance normally invisible and capable of being made visible upon the application of ultraviolet rays.

3. An improvement in the art of laundry marking which consists in first applying to a laundry article fabric one solution and later applying to the same laundry article another solution in the form of a laundry identification mark, said solutions having the characteristics that when united in and around the fibers of a fabric they will so react as to form a solid or semi-solid substance which becomes fixed in and around the fibers of the fabric by mechanical entanglement or otherwise, said solutions also containing a substance normally invisible and capable of being made visible upon the application of radiant energy.

4. An improvement in the art of invisible identification of fabrics which consists in separately applying to the fabric two liquid components of an ink, one of which is applied in the form of the desired identification mark, one of said liquid components having the characteristics of zinc chloride and also the characteristics of manganous sulphate, and the other liquid having the characteristics of sodium silicate to serve as an activator for the compound thus formed.

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