

UNITED STATES PATENT OFFICE

2,059,475

DRY CLEANING

Latimer D. Myers, Cincinnati, Ohio, assignor to
Emery Industries, Inc., Cincinnati, Ohio, a corporation of Ohio

No Drawing. Application October 7, 1932,
Serial No. 636,769

3 Claims. (Cl. 68—38)

This invention relates to an improvement in the art of dry-cleaning fabrics, garments, textiles, cloth, rugs, and articles of like nature, which, for the sake of convenience throughout the remainder of this description, will be designated by the term "fabrics" unless otherwise specifically identified. While special equipment may be designed to facilitate the practice of this invention, still it is fully susceptible to being practiced on a large commercial scale with practically all of the types of equipment currently used in modern up-to-date dry-cleaning establishments.

The dry-cleaning process involves treatment of the fabrics with light petroleum fractions such as naphtha or other grease solvents, for example—chlorinated solvents. The term "cleaning solvents" will be hereinafter used to denote these bodies and their equivalents in function. At present, the process is usually practiced by treating each lot of fabrics three or more times in rotating drum type washers containing the cleaning solvent. The first treatment is called the "break". The second treating solution usually contains a so-called dry-cleaning soap adapted to decrease static and lower surface tension. Next, the fabrics are given one or more rinses in cleaning solvent.

The articles are then centrifugally extracted and dried either in rotary drum type dryers or in heated rooms. By this treatment oily and greasy stains and soil are removed without shrinkage of the fabric or damage to the sizing and finishing materials, the dyes or the fibre itself.

According to recent practice, some of the water soluble soil is removed from the fabrics being cleaned by utilizing a dry-cleaning soap containing moisture or by adding water directly to a cleaning solvent containing an absorbefacient, as disclosed in the co-pending application of Warren T. Reddish, Serial No. 590,981, filed February 4, 1932, now Patent No. 1,911,289, issued May 3, 1933.

This treatment in which moisture is used in conjunction with the cleaning solvent, is usually the middle one of three treatments of the fabrics being cleaned. It is customary in all of these three or more treatments of the fabric being cleaned, to filter the cleaning solvent during part or all of the period of the treatment in order to keep the cleaning solvent clear and remove all filterable particles detached from the fabrics being cleaned by the action of the solvent. Usually the solvent is drawn from the bottom of the

washer by means of a pump, forced through a filter and returned to the washer. The solvents used for each of these treatments are sufficiently clarified by the filtration to serve for a number of loads of fabrics, though the solvent must be renewed or redistilled periodically due to its gradually increasing content of oil soluble materials. A great many of these materials dissolved by the cleaning solvent are either odoriferous per se, or inclined so to become upon exposure to the atmosphere, with the result that fabrics which are not cleaned in relatively fresh solvent, tend to develop an unpleasant odor.

It may be said that all fabrics cleaned by the processes heretofore known, had some tendency to develop unpleasant odor as a result of traces of odor-developing material filming over them, the tendency being a function of the concentration of such materials in the cleaning solvent.

One object of this invention is to provide a method of clarifying, purifying, and reducing contamination in a dry-cleaning solvent.

Another object of this invention is to provide an improved dry-cleaning process by means of which the fabrics cleaned have less tendency to develop unpleasant odor than fabrics cleaned by the processes heretofore known.

Another object of the invention is to provide a method of treatment for dry-cleaning solvents which permits longer periods of use thereof without recourse to distillation.

While these features of the process of this invention are of very great importance and utility, still the specific problem which brought this improved process into being has to do with some very complex difficulties which developed rather recently in the dry-cleaning industry. In order to understand the nature and perplexing aspects of these difficulties, it is necessary to understand the details of the dry-cleaning process as actually practiced in a majority of plants throughout the country.

After the fabrics or garments are received by the plant, they are sorted according to both material and color, that is, first into silks, artificial silks, and other light weight fabrics, and into lots of woolen, fur-trimmed garments, etc. Usually these lots are subdivided each into white or light, medium, and dark colored batches. The number of garments required for a single treatment, depends upon the capacity of the machine and usually ranges from ten to sixty pounds for silks and from thirty to two-hundred pounds for woolens.

Now, the manufacturers of textiles and fabrics

have for several years been developing new and cheaper fabrics, new and cheaper dyestuffs, and new and cheaper methods of applying the dyestuffs and finishing the fabrics. Today, the fabrics and dyestuffs in common use are often very inferior in quality and make cleaning without injury very difficult. As a result of the use of fugitive dyestuffs or improper methods of application, or both, by the textile manufacturers, together with the introduction of new fabrics, the dry-cleaner is being confronted to an ever-increasing extent, with the problem of certain types of white or light colored materials turning pink, green, yellow, purple, or most often, blue, during the dry-cleaning process. Heretofore no satisfactory method has been found for combatting this difficulty. The color may be discharged by means of the usual stripping agents but usually returns upon exposure to the oxidizing action of the air. The color may also be removed by long treatment with hot, strong soap solution, but this treatment almost inevitably results in irreparable damage to the fabric or garment and is therefore not practicable.

Therefore, the specific object of the invention is to provide a new method whereby the tinting caused by the bleeding of colors in the dry-cleaning process is obviated.

It is usual in the practice and technique of the dry-cleaning plants, to run light goods, then medium, then dark, in any given batch of cleaning solvent. This practice would seem to tend to reduce the likelihood or danger of tinting from color bleeding to a minimum. However, a piece of white material may be used as trimming on a dark silk dress and therefore have to go into the same washer. Instances of tinting light colored trimming materials have been extremely frequent. However, in a batch of whites, tinting of individual articles often takes place as a result of fugitive dyestuffs having bled from material in some previous batch. It is extremely expensive to redistill the dry-cleaning solvent every time a new cycle of batches is started, (perhaps several times a day), and even so this does not take care of the cases where light colored trimming on dark garments tints.

The fact that only one particular garment in a load of white material might become tinted with no colored garments present in the particular load, therefore presented a very perplexing and puzzling problem.

An exhaustive study of the dry-cleaning process as practiced in many different plants, and a close analysis of the textile fibres of the fabrics being cleaned and of the dyestuffs being used, has led to the following conclusions. The white or light colored materials most susceptible to being tinted by bleeding dyestuffs, are of a type possessed of affinity for dyestuffs different from the more conventionally used materials. Many types of rayon such as oil delustered viscose or cellulose acetate are examples of the light colored materials which tend to tint with the dyestuffs which most frequently bleed during the dry-cleaning process, particularly in the treatments involving the use of a moist, soap solution. The dyestuffs which have the tendency so to bleed are for the most part basic dyestuffs usually employed to top blacks or dark blues to increase their luster. Examples of dyestuffs of this type are the Azine, Oxazine or Thiazine class of dyestuffs such as Methylene Blue, Color Index No. 992, Nile Blue, Color Index No. 913, Meldolas Blue, Color Index No. 909, Capri Blue, Color

Index No. 876, etc. Due to the combined solvent action of solvents and/or fatty acids and moisture blending agents, such as the glycol ethers or hydrogenated hydroxy aromatic compounds present in most dry-cleaning soaps, these topping colors are partially removed and retained in the soap solution of dry-cleaning solvent. They are present either in solution or in such a fine state of division that they are not removed by the filtration process; they remain in the solvent or soap solution and tint those fabrics which are susceptible to them.

The degree of bleeding is not usually sufficient to fade the material from which the dyestuff is removed to any discernible degree, but a small amount of the dyestuff loosened from the material either by mechanical agitation or solution by the solvent, is sufficient to tint those materials, (such as most grades of oil delustered viscose rayon) which are very susceptible to dyestuffs of the particular classes described. The explanation above presented has been verified by exhaustive laboratory research and actual confirmation in plants operating upon a commercial scale.

The problem having been defined, the concept was developed of employing absorptive materials adapted to be added to the dry-cleaning solution which might exert a greater power of absorption for the particular types of dyestuffs in question than the dry-cleaning solution or the susceptible material.

Obviously the specific offending dyestuffs and susceptible materials vary from year to year with changes of style and of technique in textile making.

Though the bleeding dyestuffs would seem to be entirely non-analogous to the coloring substances found in petroleum, still the inventor has discovered and determined that the types of earths used in the petroleum industries to improve the color and clarity of petroleum products, such as lubricating oil or medicinal white oil have the peculiar and requisite properties of exercising greater power of absorption toward the bleeding dyestuffs than do dry-cleaning solutions.

The materials of this type which accomplish this specified function, also possess the unexpected property of absorbing materials dissolved in the cleaning solvent not susceptible to being removed by filtration which are either odoriferous per se, or have a tendency to become so upon exposure. Therefore, the practice of this invention which comprises subjecting the dry-cleaning solvent to the absorptive action of a material of the class described, performs the two-fold function, first, of preventing tinting, and second, of prolonging the life of any particular batch of dry-cleaning solvent by removing odoriferous substances therefrom and thereby decreasing the likelihood of traces of such substances becoming associated with the fabrics being cleaned.

Broadly speaking, this aspect of the invention comprises, removing dyestuffs which have become loosened from fabrics by absorbing them from the solution by means of a porous or cellular solid material introduced into the solution or otherwise contacted with it.

The invention is particularly valuable when practiced in the dry-cleaning art in conjunction with a solution containing absorbed moisture inasmuch as the absorbed moisture, while highly useful otherwise, does in some cases augment the tendency to bleed of certain dyestuffs. A great variety of these absorbent solids have been developed for specific uses in diverse arts and are

now readily available for use in the dry-cleaning art, to meet the specific problems of the nature outlined as they arise.

Whether the clarifying material of the type described be disposed immediately in the washer with the fabrics being cleaned or be distributed over the filter pads or in the filter mechanism, it exerts no tendency to bleach, fade or decolor any of the fabrics in the batch, but its effect is confined to absorbing the offensive dyestuffs and odor-constituting materials.

The earths most suitable for use in practicing this invention are well known in the petroleum refining art in which they are termed "activated absorbent earths". The earths at present on the market are those which give an acid reaction in water in their finished form and are of the type exemplified by the earths obtained from Chambers, Arizona, Tehachapi, California, Somerville, Texas and Macon, Georgia. Activated absorbent earths are obtained by treating the earths of the type exemplified by the materials obtained from the above-mentioned localities with sulphuric acid after the earths have been dried, crushed or ground, the method of treatment being similar to that described on page 40 of the United States Bureau of Mines, Technical Paper 438 on Bentonite. One suitable proportion has been found to be eight ounces of earth for a forty pound load of silks being cleaned in one-hundred-twenty gallons of solvent. It is considered good practice to put the absorbent earths right in with the load of dark colored fabrics suspected of containing the offending dyestuffs. Of course, it must be understood that in all cases the earth may be added as needed or as indicated by the development of color or odor in the solvent. It must be understood likewise that the problems which occasioned this invention occur in relation to dry-cleaning a series of batches of individual fabrics, that the nature of the fabrics varies from season to season, year to year, locality to locality, that the textile fabrics, dyestuffs employed, and methods of application are constantly changing, and that no two batches are ever alike and that, therefore, it is impossible to provide a specific example of the operation of this process which could supplant judgment and intelligence on the part of the cleaner.

However, in every case, the use of an absorbent earth of the class described tends to prolong the useful life of a given batch of solvent, improves the dry-cleaning process from the point of view of the quality of the work, particularly in regard to the lessening of odor, and materially reduces tinting, the degree of perfection of the result achieved being in all cases a function of the skill and judgment of the individual cleaner.

The invention may be regarded also from the point of view of a new art of maintaining clarity of dry-cleaning solvents and so regarded, comprises periodically analyzing or determining the nature of the dyestuffs suspended in the dry-cleaning solvent, then removing said dyestuffs from the solvent whenever necessary by treating the solvent with an absorbent solid material possessed of specific absorbent capacity for the offending dyestuffs. The times when these analyses should be made vary from place to place but generally speaking, spring and fall are the

critical times in that it is then that the garments made from new types of fabrics colored with new dyestuffs are first tendered to cleaning.

While it may be necessary to try a number of different absorbent materials in order to find one best adapted to remove some new type of offending dyestuff, still it is only necessary to put some of the dry-cleaning solvent in a test tube and shake it up with the different absorptive materials, one after another, in order to select the one which works best. This testing for specific absorptive capacity is not to be confused with experimentation as it is well within the skill of the dry-cleaner or the manufacturer of dry-cleaner's supplies, and requires no more skill than is required of a machine designer in laying out a cam contouring or portioning a lever or choosing an alloy for a specific machine part.

The discoveries constituting this invention have been verified and the recommended procedure proven by long continued commercial operation conducted under the most careful scrutiny and observation.

Having described the invention, I desire to be limited only by the ensuing claims:

1. The method of protecting materials of the type exemplified by oil delustered rayon from the tinting action of dyestuffs of the type exemplified by the Azine series or their derivatives during the process of dry-cleaning fabrics in a batch of cleaning solvent containing absorbed moisture in which the susceptible material and the fabric dyed with the fugitive dyestuff are cleaned, said method, comprising, removing dyestuff which may be suspended in said cleaning solution from said cleaning solution by treating said solution with an activated absorbent earth of the type employed in the petroleum refining industry for clarifying medicinal white oil which is possessed of the capacity to absorb the dyestuff from the dry-cleaning solution at the time said materials are being treated in said dry cleaning solution.

2. In the dry-cleaning art, the method of removing a dyestuff which has bled from fabrics as a result of the absorbed moisture in the solvent, said method comprising, extracting the dyestuff from the solvent by means of an activated absorbent earth of the type used in the petroleum industry possessed of specific absorbent capacity in relation to the dyestuff by adding said activated absorbent earth to said solvent at the time said fabrics are being treated by said solvent.

3. The method of protecting materials of the type exemplified by oil delustered rayon from the tinting action of dyestuffs of the type exemplified by the Azine series or their derivatives during the process of dry cleaning fabrics in a batch of cleaning solvent containing absorbent moisture in which the susceptible material and the fabric dyed with the fugitive dyestuff are being cleaned, said method, comprising, adding to the dry cleaning solution in the washer in which the materials are being cleaned, an activated absorbent earth of the type employed in the petroleum refining industry for clarifying medicinal white oil which is possessed of greater absorbent capacity for the fugitive dyestuffs than the material susceptible to the tinting action of said dyestuffs.

LATIMER D. MYERS.