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FABRIC CLEANING PROCESS

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ABSTRACT OF THE DISCLOSURE

A dry cleaning process which involves placing in an air impermeable bag a fabric to be cleaned and a quantity of substantially dry cleaning agent, sealing the bag to confine therein the fabric, the cleaning agent and a quantity of cushioning air, tumbling the bag to cause the cleaning agent to clean the fabric, removing the cleaned fabric from the bag, and removing the cleaning agent from the fabric.

BACKGROUND OF INVENTION

This invention relates to the dry cleaning art, and, more particularly, to a process especially adapted to the cleaning of draperies and other fabrics made of glass cloth and other materials.

Draperies made of glass cloth and other fabric materials are commonly quite bulky and very difficult to clean satisfactorily when soiled. Conventionally, articles of this nature are cleaned by agitating them in a liquid cleaning agent, usually an organic or other nonaqueous solvent, for a period of approximately thirty to sixty minutes, utilizing a conventional solvent-bath cleaning machine. Such extensive agitation tends to damage the fabrics being cleaned because of the constant rubbing of the threads and/or fibers of the fabric against each other. At the conclusion of the cleaning cycle, the articles are placed in a hot air tumbler to dry the material and eliminate any solvent odors. This operation requires approximately thirty to forty-five minutes and results in additional friction damage on the fabric. Also, the heat of the tumbler causes shrinkage, which shrinkage may be very nonuniform when handling draperies comprising fabrics of glass fibers and stitching made of materials other than glass fibers. After the articles are removed from the tumbler, they must be stretched back to their original configurations and steamed to maintain such configurations. If a stretcher is not available to the operator, the articles are merely steamed and pressed and returned to their owners in their shrunken conditions.

Liquid cleaning agents utilizing organic or other nonaqueous solvents have cleaning disadvantages. For example, they dissolve out all of the natural oils present in non-synthetic fibers, which shortens their life. Also, such solvents have a tendency to dull bright colors and to discolor the fabrics, particularly by yellowing them. Additionally, many solvents of this type have high fire hazards and may represent health hazards.

Conventionally, some of the foregoing disadvantages are eliminated, particularly in cleaning draperies or other articles of glass fibers, by literally washing them in water containing an aqueous cleanser. However, the prolonged agitation necessary for reasonably adequate cleaning severely damages the glass fibers, as does the subsequent hot-air tumbler necessary for drying. Additionally, severely nonuniform shrinkage results in draperies or other articles comprising glass-fiber fabrics and nonglass stitching, shrinkage of such stitching tending to draw the articles along any seams.

SUMMARY AND OBJECTS OF INVENTION

A primary object of this invention is to provide a clean-
ing process which eliminates most or all such disadvantages and drawbacks of prior processes.

More particularly, the primary object of the invention is to provide a process which may be employed to clean such draperies and other fabric materials which will remove substantially all soil and dirt therefrom, will not shrink or deform the material, will not damage or discolor the fabric, and which is substantially more economical to practice than any known conventional process or method. In general, we prefer to accomplish this by confining the subject, such as soiled drapery or a piece of fabric to be cleaned, together with a substantially dry pulverized cleaning agent, in a container of restricted volume, tumbling the container at a rate and for a period of time sufficient to remove substantially all soil and dirt from the subject, removing the subject from the container, and continuing the tumbling thereof while passing a flow of air therethrough for a sufficient period of time to remove the cleaning agent from the subject.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT OF INVENTION

In the practice of our process, we prefer to use a conventional tumbling machine which employs a cylindrical drum rotatable on a horizontal axis at about 40 r.p.m. and which is adapted to receive and hold objects to be tumbled, the machine having means for forcing or drawing a flow of air through the drum during its rotation, as desired, with the usual suitable controls, usually electric, for operating and controlling the rotation of the drum and the passage of air therethrough.

The cleaning agent which we prefer to use is a substantially dry one comprising a vehicle such as fine sawdust or ground wood, ground to a fineness of about 40 to 100 mesh, and impregnated with any suitable aqueous cleanser. The cleaning agent is prepared by mixing the vehicle and the cleanser, using about one pound of vehicle to about four ounces of cleanser, sufficiently to thoroughly impregnate the vehicle with the cleanser. Insufficient cleanser is used to render the resulting cleaning agent wet or tacky, and if prepared as directed the cleaning agent will be substantially dry and free flowing.

In performing our process, a fabric article, such as a drapery or other unit of fabric to be cleaned, is placed in a flexible bag made of material substantially impermeable to air leakage. We have found conventional polyethylene bags suitable for such purposes. The article is placed in loose, rumpled, disorder in the bag, and the bag is preferably only large enough to loosely accommodate the article or articles to be placed therein in such loose array. A suitable quantity of the cleaning agent is then loosely deposited in the bag around the article therein. We have found that about two to six ounces of cleaning agent per pound of the article or articles in each bag is adequate. The bag is then sealed or closed to eliminate any substantial leakage of air therefrom. Some air remains in the bag around and through the article to be cleaned, and this is an object of the invention, for purposes to be described hereinafter.

Next the tumbling machine is loaded with a plurality of the loaded bags. Such conventional tumbling machines are commonly available on the market in various sizes, to handle loads of various sizes. For the practice of our invention, we prefer a machine having a drum capacity of about 100 pounds, although larger or smaller machines may also be employed if desired. Since in any of such machines the load must be distributed fairly evenly around the interior of the rotatable drum, to equalize the load on the bearings for the drum, the maximum size of the bags to be used is determined largely by the size of the machine, because if the bags are too large relative to the size of the machine, an insufficient number of bags
can be placed therein to circumferentially equalize the load on the machine. The only minimum limit on the size of such bags is the minimum volume occupied by their contents. However, for a plurality of small articles to be cleaned, such as small drapes, we prefer to use a bag of larger size and load several of the articles in each bag. For such a machine having a load capacity of 100 pounds, to insure proper distribution of load, we prefer to use bags each of which is no larger than is required to accommodate a bag load, of drapery or other fabric, of not more than 10 pounds. Bags of varying sizes and load weights may be loaded together into the machine for a run, if they can be so distributed therein to at least fairly well distribute their weight around the drum of the machine. Having loaded the tumbling machine with loaded bags, the machine is operated in conventional fashion, in which its drum is rotated at about 40 r.p.m. to rotate and tumble the contents therein, this being done at room temperature. Such tumbling agitates all of the loaded bags in the machine, and their contents, to circulate the cleaning agent in each bag over the surface of the article being cleaned therein. Even if some of the cleaner impregnated in the sawdust or other vehicle flashes off, it is confined in the bag and circulates therethrough and through the article being cleaned therein. The combined action of the cleaning agent moving over the surface of the article being cleaned and the folds of the article itself on each other, in the presence of the cleanser, during tumbling, provides a cleaning action in which dirt and other soil producing materials on the surface of the article are removed and then picked up, or removed, by the sawdust vehicle to which they adhere. The tumbling is continued for 45 to 60 minutes, with such a tumbling machine of 100 pound rated capacity, to provide a usually adequate cleaning action. Of course, the degree of soil of the articles to be cleaned determines the length of time that the articles must be tumbled to obtain optimum cleaning thereof. However, with such a machine as in the cleaning of draperies or other articles in a normally heavily soiled condition, tumbling for 45 minutes is usually adequate to obtain an optimum cleaning result.

The use of separate, closed, air-impermeable bags during the cleaning cycle is an important feature of the invention, and produces a far more effective cleaning action than if the fabric articles to be cleaned are merely loosely disposed in the tumbling machine and tumbled, this being due to the fact that the cleaning agent is maintained in close proximity to the article or articles being cleaned in each bag. Fabric articles tumbled in such closed bags exhibit far less wear resulting from the tumbling than if merely tumbled loosely, the air confined in each bag apparently acting as a protective cushion for the fabric article or articles therein. Also, there is less "friction" of the article or articles being cleaned in each bag, as compared to free tumbling in the tumbling machine, because of the restraint imposed by the bag itself. This not only results in less "friction" damage, but also prevents the articles from being pulled out of shape because of the restraint imposed by the bags. In conventional free tumbling, the articles being cleaned are frequently pulled out of shape badly because of the tangling of the articles which inherently occurs, tangling being virtually impossible with the present invention. Still another advantage of tumbling the articles in sealed bags is the absence of any discharge of fumes or dust from the tumbling machine, all components of the cleaning agent being confined in the bags. Yet another advantage of tumbling in sealed bags is that it provides an easy method of keeping separate orders intact. In other words, individual orders can be placed in separate bags, thereby avoiding any sorting operation. Similarly, various types or colors of materials can be cleaned in the same load by isolating different types or colors in separate bags.

Another general advantage of tumbling the articles in sealed bags during the cleaning operation is the conditioning effect it has on the articles being cleaned, not only on draperies, but on such articles as blankets, spreads, comforters, clothing, and the like. The materials remain firm, yet to the touch they have a soft, fluffy, pliable feel. Matting, clotting, harshness, and the like, are virtually nonexistent as compared to conventional cleaning operations wherein the articles are tumbled freely. Usually pressing, steaming, and stretching are unnecessary.

At the conclusion of such cleaning, which may be referred to as the cleaning cycle or first tumbling cycle, the operation of the tumbling machine is discontinued. The bags are then opened, either in or outside of the tumbling machine, and their contents are placed loosely into the drum of the tumbling machine, the bags being reusable for subsequent cleaning operations. The machine is then operated again to tumble the loose contents of the drum, and air is forced or drawn through the drum for about 20 to 45 minutes. This air stream and the tumbling, combined, completely removes all loose sawdust vehicle from the cleaned articles, as well as all vaporized cleaner. Such vehicle and cleanser may be collected in suitable traps and reused, if desired. This second tumbling cycle may be referred to as a finishing cycle. Upon its conclusion, the cleaned fabric articles are removed from the machine and processed in the usual conventional way to prepare them for the customer, such as table folding, in the case of draperies, and individual bagging for shipment and delivery to the customer.

Comparative tests have established that our invention is much more effective in cleaning fabric articles, particularly glass fiber draperies, than the usual conventional cleaning methods. In other words, a much higher proportion of the soil is removed.

We claim:
1. A dry cleaning process, including the steps of:
(a) inserting into an air impermeable bag a soiled fabric to be cleaned and a suitable quantity of a substantially dry cleaning agent comprising carrier particulate matter impregnated with a cleaner;
(b) sealing the bag to confine therein the fabric, the cleaning agent and a quantity of cushioning air;
(c) tumbling the bag for a period of time sufficient to permit the cleaning agent to remove from the fabric a majority of the soil on the fabric;
(d) opening the bag and removing the cleaned fabric therefrom; and
(e) separating the cleaning agent from the fabric.
2. A process as defined in claim 1, in which:
(a) the cleaning agent is separated from the fabric by continuing the tumbling of the fabric while conveying air therethrough, to remove the cleaning agent from the fabric.

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