METHODS AND MEANS FOR TREATING SURFACES

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Field of Search 134/6, 15/230.16, 230, 210 R.

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Abstract
Oscillatory-drive machine for cleaning rugs and hard surfaces. It employs in contact with the surface of a rug, tile or floor a layer of elastic material the working face of which has an irregular contour.

13 Claims, 4 Drawing Figures
3,655,444

1 METHODS AND MEANS FOR TREATING SURFACES

BACKGROUND OF THE INVENTION

Surface treating machines heretofore available employ rotating brushes or oscillating pads of abrasive material to clean hard surfaces. The same have been applied to cleaning rugs, but not with complete satisfaction. Rotating brushes tend to unwind the rove or twist of high-pile cut-loop rugs, and to pull threads or fibers from other types of rugs, thus discouraging frequent cleaning. Pads of abrasive materials are too harsh, exerting excessive frictional force, for most rugs. Moreover, brushes and sponge-like pads tend to hold water in excess of amounts which are suitable for rug cleaning, making it difficult to control the amount of water used in a cleaning operation.

DESCRIPTION OF THE INVENTION

The present invention teaches new methods and means of cleaning rugs, and surfaces of other materials such as tiles, wood and the like, using a layer of resilient material one surface of which, having an irregular contour, provides a working face in contact with the surface to be cleaned. A sheet of vinyl, of the elastic type which preferably is backed with a woven fabric, is suitable for use as the elastic material. It may be further backed with a resilient pad, of rubberized hair or sponge rubber, for example. It may be driven in any suitable path over the surface to be cleaned; an oscillatory path, as provided by the machine described in U.S. Pat. No. 3,416,177, has been found to be particularly suitable.

Embodiments of the invention are described with reference to the accompanying drawings, in which:

FIG. 1 shows an oscillating-drive type machine employing the invention applied to the cleaning of a high-pile rug;

FIG. 2 shows a second embodiment of the invention;

FIG. 3 shows a third embodiment of the invention; and

FIG. 4 shows three examples of irregular face contours suitable for use in the invention.

FIG. 1A represents a simple form of oscillating-drive type machine, to which a surface-treating member illustrated in FIG. 1B is attached. The machine has a frame 10 supporting a motor 11 having a rotatable shaft 12 supported in a bearing 13. Eccentrically mounted on the shaft is a drive spindle 15 the far end of which engages a bearing 16 which is affixed to a support plate 20. The plate 20 is mounted near its corners to the ends of resilient posts or stand-offs 25, which in turn are mounted to the frame 10 on the frame 10. When the motor is actuated, the support plate is driven in an oscillatory path, which is parallel to the surface to be treated.

A pad 30 of sponge rubber is affixed to the face 21 of the support plate which is intended to be used confronting the surface of the rug 31 to be treated, as is illustrated in FIG. 1B. Overlying this face 21 is a layer of elastic material 32, such as a layer of elastic vinyl plastic material. As illustrated, this is a vinyl sheet which is backed with a woven fabric 33, which is affixed to the pad 30. The pad 30 and plate 20, and the fabric 33 and pad 30, may be held together by cements which are suitable for each type of interface. Such cements are well known, and need not be described. For example, sponge rubber can be cemented to metal with elasticized contact adhesive; and woven fabric can be cemented to sponge rubber with the same cement.

The face 35 of the elastic material 32 which confronts and is brought into contact with the surface of the rug 31 is the working face; it has an irregular contour. Examples of suitable irregular contours are illustrated in FIG. 4, to be described below. According to the present invention, it has been found that an elastic material such as vinyl in sheet form, the working surface of which is embossed or otherwise treated to be irregular, can furnish an amount of friction which is suitable for cleaning rugs, without doing damage to the rugs during the cleaning operation. Unlike materials which are abrasive in nature, or brushes, resilient materials used as taught by this invention do not unwind the twist of high-pile rugs, or pull fibers or threads from rugs of these or other types. Moreover, since such elastic materials do not themselves soak up liquids, they offer a dramatically greater opportunity to control the amount of water or other liquid being used in a cleaning operation. Wetting of a rug during cleaning can thereby be significantly reduced.

FIG. 2 illustrates a subassembly of a resilient pad 40, here shown as rubberized hair, and a layer of fabric 33 backed elastic material 32 permanently attached to it, as by a suitable glue or cement (not shown), which is detachably attachable to the support plate 21. For this purpose, fastening means comprising an array of small hooks 41 of the kind which will engage and hold the fibers of a fibrous body, like the pad 40, when the latter is pressed against the face 21 of the support plate 20, are mounted on the face 21 of the support plate. By these means the subassembly is made easily replaceable.

As is shown in FIG. 3, the elastic material 32 may be adhered directly to the support plate 20, via the woven fiber backing, if the latter is used. Whether or not a layer of resilient material (30 in FIG. 1; or 40 in FIG. 2) is used between the plate 20 and the layer of elastic material 32 will depend on the degree of resilience desired in the contact made between the working face 35 and the surface to be treated.

FIG. 4 (A, B and C) shows various patterns of embossing on the working face 35 which can be used to impart to that face a desired amount of irregularity. Vinyl plastic sheets can be made smooth and, when embossed the ridges and other "high" regions formed on the working face will depart by a controlled amount from a smooth surface. At the same time, because the vinyl material used is elastic, such ridges and high regions will pull gently on the material (e.g. a rug) being treated, and will yield before tearing out fibers or unwinding yarns, unlike materials which are primarily abrasive materials.

The degree of "yield" can be controlled somewhat by the choice of resilient pad, if one is used.

Thus, it is seen that the present invention offers a multiplicity of means to control the force used in a cleaning operation on a rug, from extremely gentle to moderately harsh, as desired. The invention can be used to pile-lift, scrub or agitate a rug, as desired.

The invention can be used also to clean, scrub, polish or strip resilient floors covered with resilient tile, such as vinyl, vinyl asbestos or cork, and hard floors such as marble, slate or terra cotta. While especially useful for rugs, it is also useful in environments where prior art materials and methods have been used with success and satisfaction. If used with oil or fine powder abrasives (e.g. rotten stone, pumice) the invention can be used to put a high shine on the surfaces of marble, wood and similar hard materials.

The layer of elastic material 32 can be a vinyl type material varying in thickness from about one thirty-second inch to up to one-fourth inch, depending upon the elasticity desired. Cloth-backed upholstery-grade vinyl sheeting is shown in FIG. 4. Other materials may be used, for example, rubber is also useful. Typically, the preferred material is non-porous, and does not absorb liquids, but the layer itself may be perforated if it is desired to increase friction, or to enhance resilience. Thus a closed-cell plastics material or foam might be used.

The invention is employed to clean rugs, for example, using the same commercially available cleaning agents, shampoos and the like as are used with prior-art machines and methods.

What is claimed is:

1. The method of treating rugs, comprising the steps of bringing into contact with a surface of a rug a face of a layer of elastic treating material, which extends over said surface in two orthogonally related directions which are in essentially the same order of magnitude, said face having an irregular contour, urging said layer toward said surface with a force that is substantially uniform throughout said layer and imparting to said layer motion in an oscillatory path or paths substantially parallel to said surface.

2. The method of claim 1 including resiliently urging said layer toward said surface.
3. The method of claim 1 in which said treating material is a sheet of plastics material having said irregular contour embossed on said face.

4. In combination, a machine for cleaning rugs comprising a treating member for surfaces of rugs having a support plate and means to drive said plate in an oscillatory path in a prescribed plane, said plate having a face intended to be used confronting a rug surface to be treated, and supported by said plate overlying said face a layer of elastic cleaning material having a working face intended to be brought into contact with said rug surface, said working face having an irregular contour for providing during drive of said treating member plate when said working face is in contact with said rug surface an amount of friction which is suitable for the desired treatment without doing damage to the structure of said rug surface.

5. A machine according to claim 4 including a layer of resilient material between said plate and said layer of cleaning material.

6. A machine according to claim 6 in which said two layers are attached together to form a unitary structure, for attachment to said face of said plate.

7. A machine according to claim 6 in which said face of said plate is fitted with means for detachably holding said resilient material affixed to said plate.

8. In combination, a machine for treating surfaces of rugs, floors and the like comprising a surface treating member and means to drive said member in an oscillatory path in a prescribed plane, said member including a support plate having a face intended to be used confronting a surface to be treated, and supported by said plate overlying said face a layer of substantially non-porous elastic material having a working face intended to be brought into contact with said surface to be treated, said working face having an irregular contour for providing during drive of said treating member when said working face is in contact with said surface to be treated an amount of friction which is suitable for the desired treatment without doing damage to the structure of said surface being treated.

9. A treating member according to claim 8 in which said elastic material is a sheet, one surface of which is said working face and in which said irregular contour is embossed on said working face.

10. A machine according to claim 8 in which said layer of elastic material is perforated.

11. A machine according to claim 8 including a layer of resilient material between said plate and said layer of elastic material.

12. A machine according to claim 12 in which said face of said plate is fitted with means for detachably holding said resilient material affixed to said plate, and said two layers are attached together to form a unitary structure.
UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,655,444  Dated April 11, 1972

Inventor(s) EDWARD G. YOUNG

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, line 20 (claim 6) "claim 6" should be
--claim 5--

Signed and sealed this 28th day of November 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR. ROBERT GOTTSCHALK
Attesting Officer Commissioner of Patents