ABSTRACT OF THE DISCLOSURE

A wheeled housing carries a motor having a shaft extending into the housing to drive a rotor which carries scrubbing brushes and foam-generating rollers. The rollers are engaged under pressure with an annular sponge surrounding the rotor and supplied with liquid detergent which, as the rotor turns, is turned into foam by the manipulation of the sponge as the rollers compress and release it. The brush carrier which is part of the rotor has scoops for deflecting the foam through openings in the carrier to pass downwards between the bristles of the brushes to loosen dirt in the rug to be lifted to the surface by the action of the brushes.

BACKGROUND OF INVENTION

Devices for this same general purpose are well-known but relatively unwieldy and complex. The objective of the present invention is to produce a more simple structure for accomplishing the desired cleaning of the rug.

SUMMARY OF INVENTION

The hand-propelled and guided housing is supported in part by rear wheels and in part by the brushes mounted on a rotor which is actuated by a motor preferably supported externally on top of the housing. The water and detergent in a tank on the guiding handle is conveyed by a hose onto a sponge ring replaceably positioned in the housing. This ring encircles the rotor which conveys motion to the brush carrier. Mounted on the rotor for engagement with the annular sponge are sponge compressors which, as shown, are rollers. The rollers, by compressing and releasing the sponge, generate foam from the liquid detergent preparation. The resulting foam falls downwards into the path of one or more scoops on the brush carrier. These scoops are associated with slots in the brush carrier through which the foam is discharged between the bristles of the brushes.

In a preferred arrangement particularly designed for application to existing rug scrubbers, a replaceable sponge is adhered to a mounting ring which, in turn, is adhered to the inner surface of the annulus made by fastening inner and outer rings in telescopic engagement, such rings having axially spaced inwardly directed radial flanges forming between them a manifold overlying the sponge and into which the detergent solution is delivered and from which it issues through holes which feed it to the sponge.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a side elevational view of a device embodying the invention, portions being broken away.

FIG. 2 is a view on an enlarged scale taken in section 2—2 of FIG. 1.

FIG. 3 is a fragmentary view on an enlarged scale in the plane indicated at 3—3 in FIG. 1.

FIG. 4 is a view in perspective showing in relatively separated positions a subhousing, a sponge ring mounted therein and a roller carrier which is mounted on the rotor which drives the brush carrier.

FIG. 5 is a fragmentary plan view of the brush carrier as it appears in inverted position, details of the bristles being omitted.

FIG. 6 is a fragmentary detail view on the line 6—6 of FIG. 3.

FIG. 7 is a view similar to FIG. 2 showing a modified and preferred embodiment of the invention.

FIG. 8 is a fragmentary detail view taken in section on the line 8—8 of FIG. 7.

FIG. 9 is a view in perspective showing in relatively separated positions the component parts of the sub-housing and sponge ring used in the embodiment of FIG. 7.

DETAILED DESCRIPTION

The specific form of the mount 8 or the manner in which it is mounted and driven is immaterial to the invention. As shown, the mount 8 is a housing which has rear wheels at 10 but has its forward portion supported only by the brushes 12. A handle 14 pivotally connected with the housing provides convenient means for guiding and propelling the specific device shown. Mounted on the handle is a tank 16 for a liquid detergent of any appropriate kind. Preferably, this is highly foamy. A valve-controlled pipe 18 conducts this preparation from the tank 16 to the interior of housing 8.

Mounted on the mount 8 is an electric motor 20 having an armature shaft 22 which actuates a rotor 24. In the instant device, this rotor is used for driving a sponge compressor carrier 26. Also driven by shaft 22 is a brush carrier 28 held by a fitting 29 and on which the bristles comprising the brushes 12 are mounted.

The carrier 26 supports and drives a plurality of rollers 30 mounted on upright rods 32 supported by brackets 34. The carrier 26 is driven by rotor 24 and is fastened to the rotor by a series of set screws 27. For driving the brush 12 from shaft 22, the carrier 26 may be fastened to the fitting 29 in any desired manner as by means of disk 31 to which the carrier is screwed.

Attached to the under side of the mount 8 is a sponge carrier 33 which is annular and encircles rotor 24. The annular sponge 40, of any appropriate material, is mounted on a removable ring 42 fixed within the carrier 38 and supplied with liquid detergent by means of the acerupted pipe 44 with which the tube 18 communicates. The pipe 44 has openings to discharge the detergent preparation onto the sponge 40 when the valve 46 is open.

The radius at which the rollers 30 are carried is such that the sponge 40 is compressed during the passage of each of the rollers 30. The initial thickness of the sponge is as indicated at the right in FIG. 2. Its compressed thickness is shown at the left in FIG. 2 where it is engaged by one of the rollers 30. This alternate expansion and contraction of the sponge by the successive rollers 30 develops foam from the detergent liquid.

The foam 47 is divided by the flange 48 on the brush carrier 28. Since the sponge does not rotate, the foam tends to be relatively stationary and consequently is picked up by the scoops 50 of the brush carrier 28. These scoops are preferably placed tangentially as shown in FIGS. 3 and 5 and they register with correspondingly disposed slots 52 through which the foam passes downwardly between the bristles of brushes 12. The foam involves relatively little liquid. It readily penetrates the rug traversed by the device and loosens dirt which is thenupon lifted to the surface of the rug by the scrubbing action of the bristles of the brushes 12. The rug is merely dampened rather than soaked and the soil is readily removed.

The preferred embodiment shown in FIGS. 7 to 9 is so designed as to be applicable, with minor modifications, to a wide variety of existing rug shampooring devices. No change is made in the mount or the brush carrier and brushes.

The particular housing 8 which is shown by way of exemplification has bracing webs 54 upon its inner periphery. These are used for the detachable support of the sta-
tionary components of the foam generator generically designated by reference character 55.

These stationary components preferably comprise an outer annulus 56, and an inner annulus 58 telescoped into the outer annulus as shown in FIG. 7. The releasable sponge ring 60 has an attaching ring 62 preferably made of cloth and having adhesive connection with the inner surface of the ring 58.

The inner and outer rings 56 and 58 and sponge ring are separately illustrated in FIG. 9. Both rings have flanges extending radially inwardly from their upper ends. The inner ring 58 has an upstanding extension flange at 64 which fits within the inner periphery 66 of the top flange 65 of the outer ring 56 to form a manifold 70 for the detergent liquid. This liquid is supplied to the manifold by the hose 18 of FIG. 1. The manifold distributes the liquid to various parts of the sponge 60 through the holes 72 in the wall 74 of the inner ring 58, such walls appearing both in FIG. 7 and FIG. 9. To assure retention of the liquid in the manifold 70 except as discharged through the ports 72, it is preferred to provide a gasket 75 of annular form which seats at its upper margin against the flange 65 of the outer annulus 56 and seats at its lower margin against the flange 74 of the inner annulus 58 (FIG. 7).

The relatively stationary components of the foam generator as above described may be attached to the housing 8 in any appropriate manner depending on the design of the housing. When the housing is provided with webs 54 as shown in FIG. 7 and FIG. 8, a convenient means of mounting comprises the provision of pairs of angles 76 welded to the external periphery of the annulus 56 and disposed to receive between them the gussets or bracing web 54. These gussets are clamped between the angles by means of bolts 78 and are further positioned by the set screws 80.

The foamy liquid thus distributed into the annular sponge 60 is developed into foam as already described by the alternate compressing and release of successive portions of the sponge by the rotation of the rollers 30 carried by brackets 34 from the rotor 24 at the lower end of the shaft 22.

Claim:

1. A rug shampooer and scrubber comprising a mount, a rotor mounted on the mount and provided with a driving shaft, a rotor having operative connections to be driven by the shaft, a sponge compressor carrier and a brush carrier on the rotor, radially acting sponge compressor means on the compressor carrier, a brush on the brush carrier, an annular sponge encircling the compressor carrier and having a periphery disposed in the path of movement of the sponge compressor means and at a radius such that said compressor means traverses said peripheral and said sponge is alternately compressed and released thereby, means for supplying a liquid detergent mixture to the sponge to be foamed by the action of the compressor means on the sponge, and means for delivering the resulting foam to the brush.

2. A rug shampooer and scrubber according to claim 1 in which the means for supplying a liquid detergent mixture comprises an annular manifold overlying the sponge and provided with apertures for delivering liquid to the sponge, and means for delivering the liquid detergent mixture to the manifold.

3. A rug shampooer and scrubber according to claim 2 in which said manifold comprises spaced upper and lower flanges on an annulus to which the sponge is attached.

4. A rug shampooer and scrubber according to claim 1 in which the mount comprises a downwardly opening housing encircling the rotor, a sponge carrier comprising a ring fixed to said housing, the sponge being attached to the said carrier ring.

5. A rug shampooer and scrubber according to claim 1 in which the sponge carrier comprises telescopically mated inner and outer annuli having axially spaced flanges, one of which has an annular axial flange extension engaged marginally with the other said flange to provide a manifold, the flange of the inner annulus having apertures opening toward the sponge.

6. A rug shampooer and scrubber according to claim 5 in which the sponge carrier has means for detachably connecting it with said mount.

7. A rug shampooer and scrubber according to claim 5 in which the sponge has adhesive connection with the inner of said annuli.

8. A rug shampooer and scrubber according to claim 5 in which the sponge has a mounting which includes inner and outer annuli having axially spaced flanges above the sponge, the sponge being attached to the inner of said annuli and the flange of the inner annulus being provided with ports opening toward the sponge, means for enclosing the space between the said flanges to provide a manifold from which said ports open, means for detachably connecting said annuli with said mount, the means for supplying liquid detergent mixture comprising said manifold and means for delivering detergent mixture thereto.

9. A rug shampooer and scrubber according to claim 5 in which the brush carrier comprises an annulus having a marginal flange and provided with downwardly extending bristles, said brush carrier having slots opening toward said bristles and being provided with scoops disposed below the level of at least a part of the sponge and traversing the space beneath said sponge to pick up and deliver through said slots the foam produced by the action of said compressor means on said sponge.

10. A rug shampooer and scrubber according to claim 5 in which the sponge compressor means include a plurality of rollers having brackets supporting them from the sponge compressor carrier.

11. A rug shampooer and scrubber according to claim 4 in which the annular sponge is mounted on said ring and said ring has means detachably supporting it from said mount to facilitate the replacement of said sponge.

12. A rug shampooer and cleaner according to claim 10 in which the brush carrier comprises an annulus connected with the motor shaft for rotation thereby and having an upturned marginal flange at a radius greater than that of the sponge and further provided with downwardly extending bristles and with slots opening toward said bristles, scoops on said carrier at a level beneath said sponge and adapted in the course of carrier rotation to pick up and deliver through said slots foam produced by the action of said rollers on the sponge.

13. A rug shampooer and scrubber according to claim 12 in which the means for supplying a detergent mixture to the sponge comprises a pipe accurately extending about the sponge and provided with apertures, said pipe having a valve-controlled connection with a supply tank and said mount comprising a downwardly opening housing encircling the rotor and having a guide handle provided with said tank.

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