United States Patent

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[54] **SHAMPOOER WITH IMPROVED FOAM-GENERATING ACTION**
10 Claims, 4 Drawing Figs.

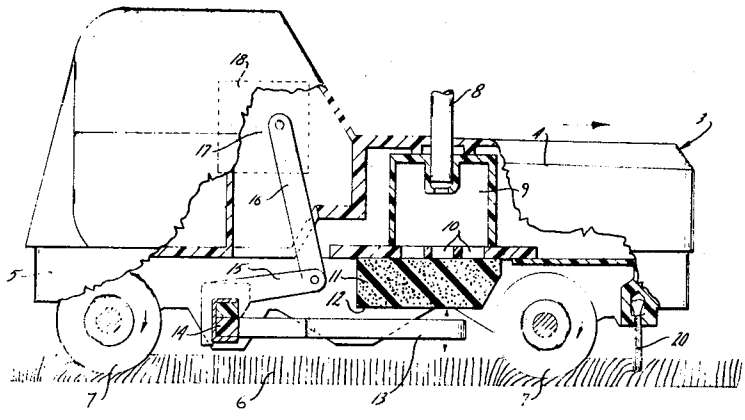
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[51] **Int. Cl.** **A47l 11/00,** A47l 11/12
[50] **Field of Search** ..... 134/6, 34; 15/50 R, 320, 89, 98, 3; 401/22

[56] **References Cited**
UNITED STATES PATENTS

3,328,829	7/1967	Nighswander	401/22 X
3,398,422	8/1968	Barry et al.	15/50 R X

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ABSTRACT: A shampooer for nap surfaces which supplies shampoo in liquid form to an elongated distributor. A spongelike pad is mounted beneath the distributor and is generally coextensive therewith. A plurality of flexible beater rods are disposed with their tips confined between the pad and the nap surface. Oscillation of the rods causes them to alternately beat the pad to form foam, and to beat the nap to drive the foam thereinto for cleaning.



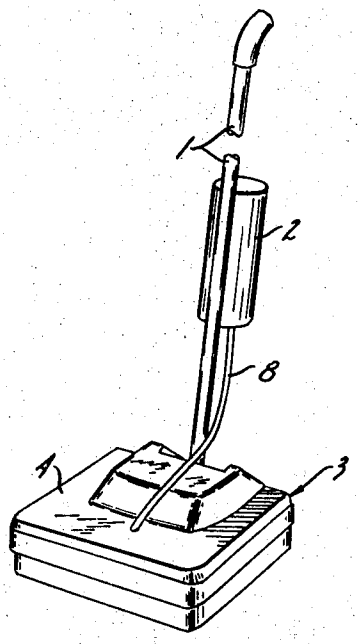
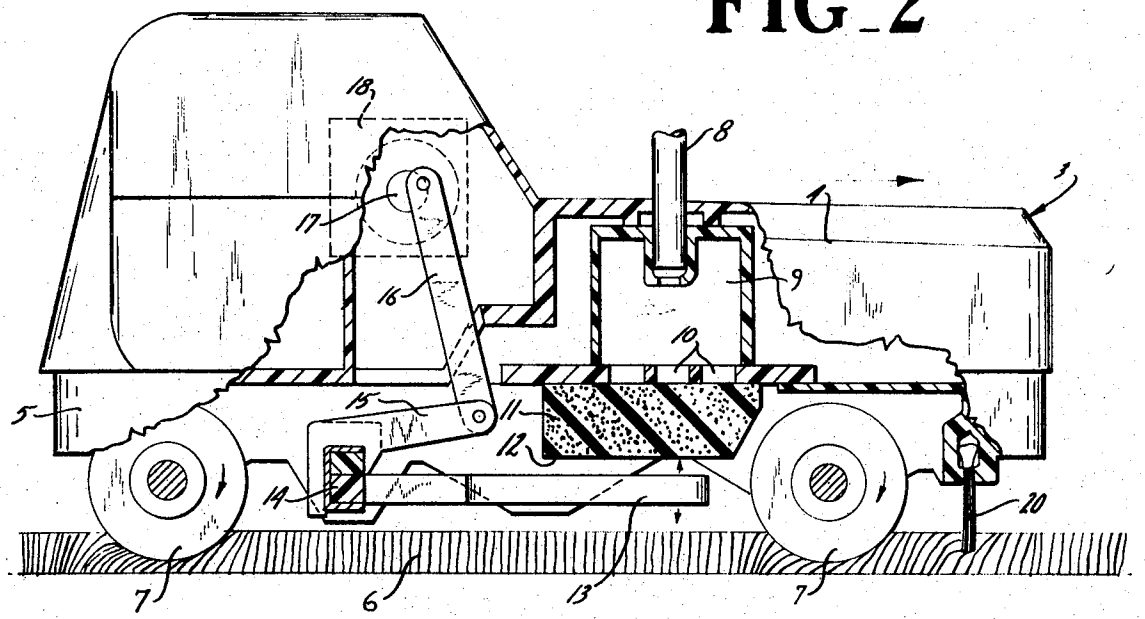


FIG_1

FIG_2



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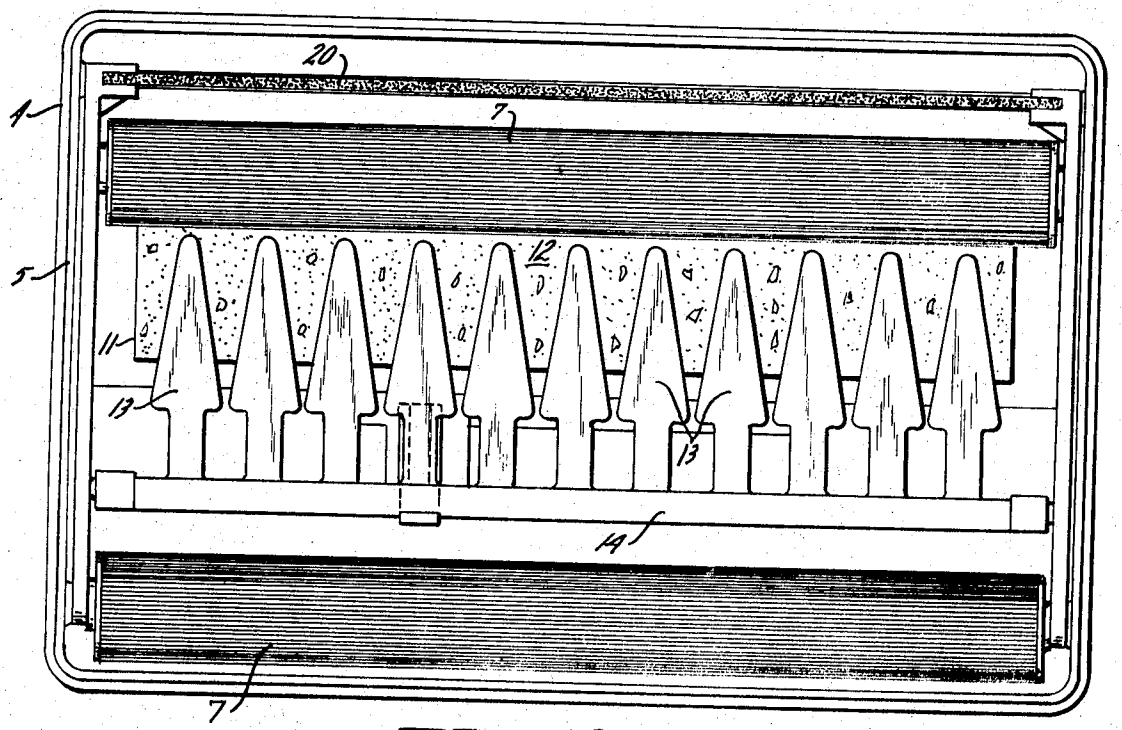


FIG_3

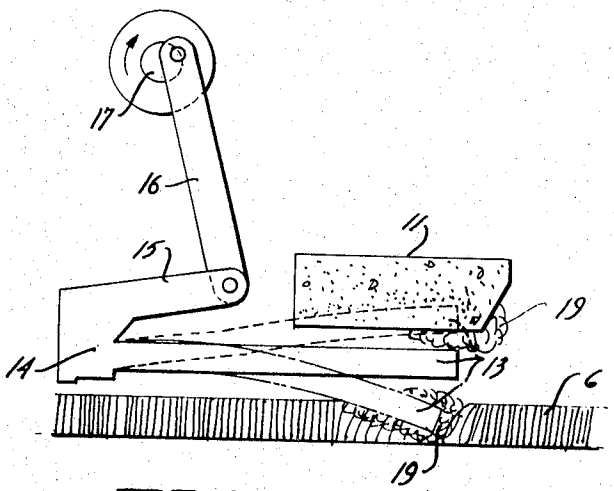


FIG_4

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SHAMPOOER WITH IMPROVED FOAM-GENERATING ACTION

BACKGROUND OF THE INVENTION

This invention relates to a shampooer with improved foam-generating action. More particularly, the invention is directed to a shampooer for the nap surface of rugs, carpets and the like and wherein a liquid shampoo material is applied to the nap surface in the form of a foam as the device is translated thereover.

In most powered rug shampooers, the scrubbing action has been created by various types of powered brushes. One problem with this approach has been that the brush bristles have tended to scrub only the top surface of the pile, and have also tended to abrade the carpet.

SUMMARY OF THE INVENTION

THe present invention solves the aforementioned problems and may utilize some of the concepts disclosed in copending U.S. application Ser. No. 848,524, filed Aug. 8, 1969by Richard F. Druart et al., entitled SHAMPOOER WITH FOAM GENERATING MEANS; copending U.S. application Ser. No. 3692, filed on even date herewith by Thomas K. Cauley, entitled NAP SURFACE CLEANING WITH TUNED FREQUENCY BEATERS and copending U.S. application Ser. No. 3694, filed on even date herewith by Hugh F. Groth, entitled NAP SURFACE BEATER APPARATUS WITH UNIFORM FORCE DISTRIBUTION. All applications have been assigned to a common assignee.

In accordance with the present invention, a plurality of rodlike beaters are positioned and confined between the nap surface and a spongelike member to which liquid shampoo is distributed. The beaters are reciprocated at a relatively high frequency so that they alternately engage and firmly press into the sponge and the nap. The beating action is generally perpendicular to the sponge and nap, creates foam in the sponge, and works it deep into the nap without abrasive action.

DESCRIPTION OF THE DRAWINGS

The accompanying drawings illustrate the best mode presently contemplated by the inventor for carrying out the invention.

In the drawings:

FIG. 1 is a perspective view of a device constructed in accordance with the invention;

FIG. 2 is a side elevation of the device with parts broken away and in section;

FIG. 3 is a bottom plan view of the device; and

FIG. 4 is a diagrammatic view showing the beater action.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in the drawings, the invention is embodied in a device for shampooing carpets and the like, and generally includes a manually operable handle 1, a liquid shampoo tank 2 secured to handle 1, and a framelike lower housing 3. Housing 3 includes an upper cover 4 and a base portion 5.

The shampooer is supported for reciprocating movement over the nap floor surface 6 by means which in this embodiment comprise a pair of rotatable rollers 7 which also may assist in working shampoo into the nap. Rollers 7 may be of any suitable construction, such as relatively rigid grooved plastic, and are suitably journaled to base 5.

The device includes a shampoo liquid supply means which includes tank 2 which connects through a conduit 8 to a transverse elongated liquid distributor 9 secured between the side walls of base 5. Distributor 9 is provided with the usual series of openings 10 for liquid to pass through downwardly. Suitable well-known means, not shown, may be utilized for controlling flow of liquid shampoo from tank 1 to distributor 9.

Liquid passing through openings 10 is converted to foam and then applied to the nap surface. For this purpose, and in accordance with the invention, a resilient liquid-receiving pad 11 is fixedly disposed directly beneath distributor 9. Pad 11 may be secured to housing 5 or to distributor 9, and in coextensive parallelism therewith. The lower horizontal face 12 of pad 11 is generally planular or convex and is spaced above floor 6 when the device is disposed on the latter. Pad 11 is preferably made of polyurethane or other spongelike material.

Further in accordance with the invention, means are provided to alternately beat pad 11 and nap surface 6 for creating and working in a foam shampoo. For this purpose, a plurality of generally parallel normally horizontal beater rods 13 are disposed beneath pad 11 for engagement with the latter and with surface 6. Rods 13 are transversely spaced from each other, are generally parallel to surface 12, and are mounted at their outer ends to a common drive bar 14 mounted for oscillatory rotation in base 5, as will be described. Rods 13 are shown as generally flat so that they form a planular beating assembly. They are preferably of a suitable flexible plastic, such as nylon, which has been designed to have a modulus of elasticity which provides a natural resonance at normal beating speeds, as disclosed in the above-mentioned copending U.S. application Ser. No. 3692. In addition, the inner end or tip portions of rods 13, beneath pad 11, are preferably of arrow shape, as disclosed in the above-mentioned copending U.S. application Ser. No. 3694.

Means are provided to oscillate drive bar 14 to create the beating action. For this purpose, bar 14 is connected through crank arms 15 and 16 to the eccentric output 17 of a motive means, such as an electric motor 18 mounted on base 5.

Operation of motor 18 will cause drive bar 14 to rotationally oscillate. This will cause beater rods 13, which are confined between pad 11 and nap surface 6, to reciprocate therebetween. Referring to FIG. 4, on the upward stroke of rods 13, they will flex and the tips will pressingly beat into pad 11, causing the liquid therein to form a relatively dry foam 19. This foam will drop down onto surface 6 through the spaces between rods 13. On the downward stroke of rods 13, they will flex and beat into nap surface 6, thus driving the foam thereinto and creating a deep-cleaning action. The alternating impingement of rods 13 on pad surface 12 and nap surface 6 will not cause any abrading action, since the beating motion is generally perpendicular thereto.

It has been found that a frequency of oscillation of about 2,400/minute to 2,500/minute produces excellent results.

In some instances, it may be desired to additionally work the foam into the nap with a lateral action. This can be accomplished by a stationary transverse brush 20 mounted on base 5 forwardly of beater rods 13.

The shampooer of the invention provides a unique double-action system for generating liquid foam shampoo and working it into a carpet or the like.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims which particularly point out and distinctly claim the subject matter which is regarded as the invention.

I claim:

1. In a device for applying liquid shampoo in the form of foam to a nap surface, the combination comprising:
   a. a liquid distributor,
   b. means to supply liquid shampoo to said distributor,
   c. a resilient spongelike pad disposed below said distributor for receiving liquid from said distributor,
   d. beater means disposed beneath said pad,
   e. means to support said device on the nap surface so that said beater means is confined between the latter and said pad,
   f. and means to oscillate said beater means so that the latter alternately beats said pad to generate foam from the liquid thereon and beats said nap surface to drive the foam thereinto.

2. The device of claim 1 in which said beater means comprises a plurality of spaced beater rods.

3. The device of claim 2 wherein said beater rods are so positioned that they oscillate generally perpendicularly between the face of said pad and the nap surface.

4. The device of claim 1:
a. in which said pad has a lower face,
b. and in which said beater means comprises a plurality of spaced flexible beater rods having tips disposed in general parallelism with said face to form a beater assembly.

5. The device of claim 1:
a. in which said beater means comprises a plurality of spaced flexible beater rods having tips disposed beneath said pad and forming a generally planular beater assembly,
b. and in which said means (*f*) comprises:
1. a drive bar to which the outer ends of said rods are mounted,
2. and motive means connected to said drive bar to oscillate the latter.

6. The device of claim 1:
a. wherein said beater means comprises a plurality of spaced flexible beater rods having tips disposed beneath said pad and forming a generally planular beater assembly,
b. wherein said means (*f*) provides an oscillation of a given frequency,
c. and wherein said rods are arrow shaped and are of a material having a modulus of elasticity which provides a natural resonance at said given frequency.

7. The device of claim 1 which includes: brush means mounted for lateral engagement with the nap surface as the device is translated thereover.

8. In a device for applying liquid shampoo in the form of foam to a nap surface, the combination comprising:
a. means to support said device on the nap surface for translation thereover,
b. means to supply shampoo foam to the surface during said translation,
c. and oscillating beater means movable in a direction generally perpendicular to the surface for driving the foam into the nap.

9. The method of applying liquid shampoo in the form of foam to a nap surface, comprising the steps of:
a. translating a sponge across said surface while maintaining the sponge spaced therefrom,
b. supplying liquid shampoo to said sponge during said translation,
c. and alternately beating said sponge and said nap surface in the space therebetween to generate foam from said liquid and to drive the foam into said surface.

10. In the method of applying liquid shampoo in the form of foam to a nap surface, the steps comprising:
a. supplying shampoo foam to said surface,
b. and beating said surface with an oscillatory action in a direction generally perpendicular thereto.

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