

[54] **SHAMPOOER WITH ROTARY FOAM
GENERATING MEANS**

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[22] Filed: **Feb. 9, 1973**

[21] Appl. No.: **331,044**

[52] U.S. Cl. **15/50 C, 15/320**

[51] Int. Cl. **A47I 11/03**

[58] Field of Search **15/40, 50 R, 50 C, 98,
15/320, 321**

[56] **References Cited**

UNITED STATES PATENTS

1,949,659 3/1934 Ritter 15/50 C UX

3,127,628 4/1964 Klumb 15/50 C
3,602,933 9/1971 Druart et al. 15/50 R
3,761,985 10/1973 Leifheit 15/50 C

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Sawall

[57] **ABSTRACT**

A freely rotatable open cell sponge-like roller is disposed below the usual distributor for receiving shampoo in liquid form. A driven rotary brush is disposed adjacent the roller, with the brush bristles impinging upon and squeezing the roller to transform the shampoo from liquid to foam. The foam is carried by the brush to the nap surface and is worked into the nap by the brush.

6 Claims, 3 Drawing Figures

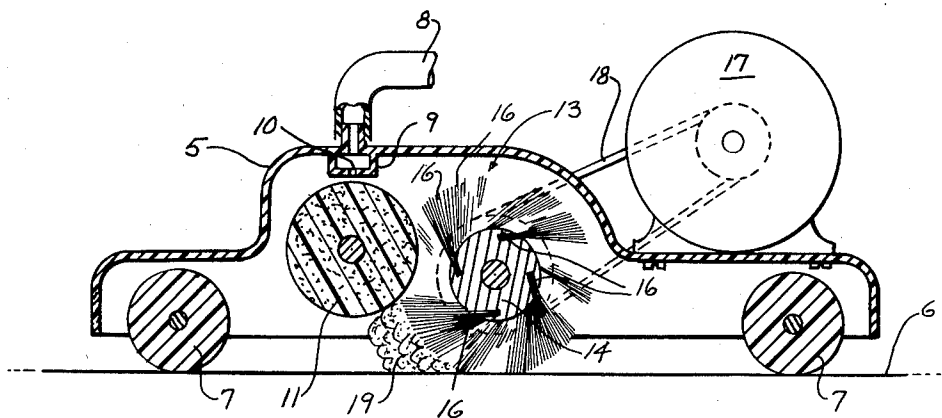


Fig. 1

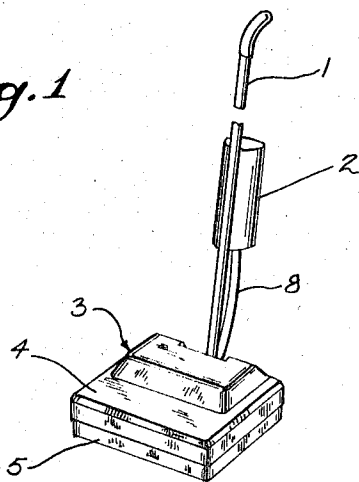


Fig. 2

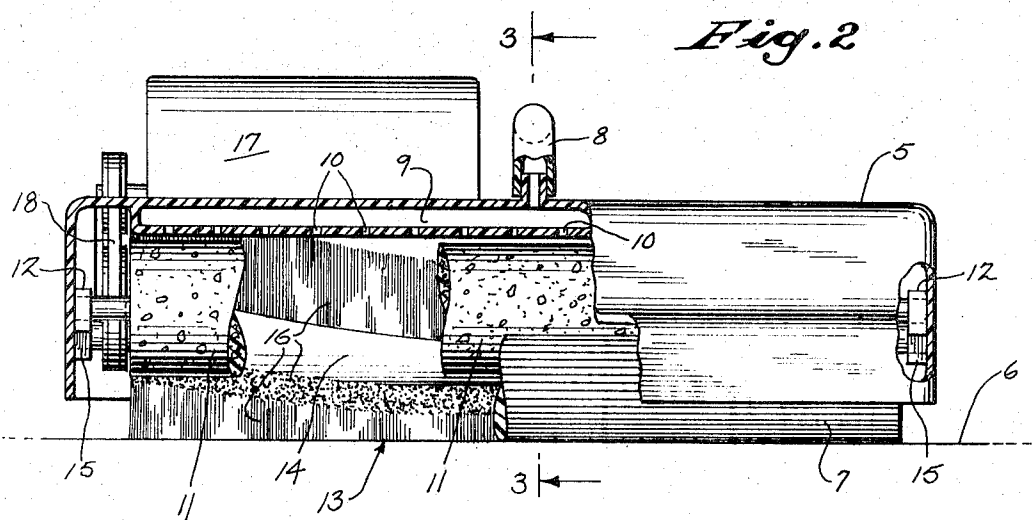
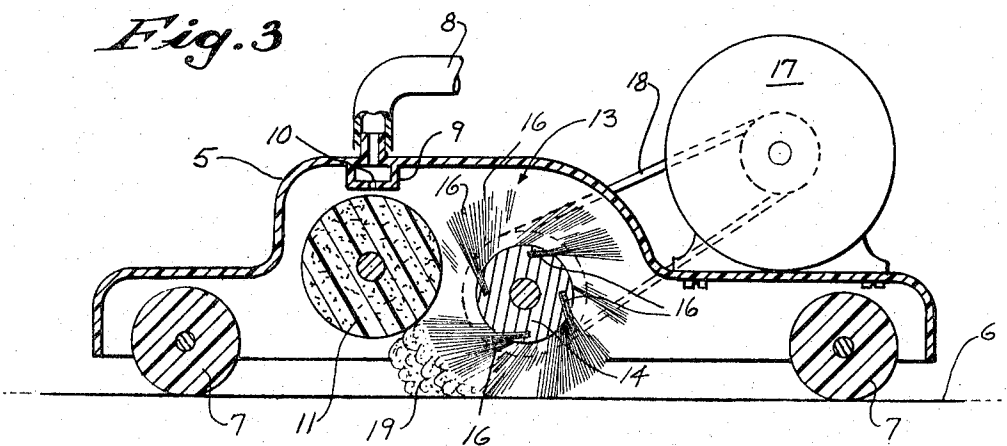


Fig. 3



SHAMPOOER WITH ROTARY FOAM GENERATING MEANS

BACKGROUND OF THE INVENTION

This invention relates to a shampooer with foam-generating means. More particularly, the invention is directed to a shampooer for the nap surfaces of carpets and the like and wherein a liquid detergent shampoo material is applied to the nap surface in the form of foam.

In recent years, do-it-yourself carpet and rug shampooing has become immensely popular. This has been primarily due to the advent of relatively inexpensive shampoo applicators such as that disclosed in U.S. Pat. No. 2,975,462 entitled "Apparatus for Applying Detergent to Rugs and the Like." In most such applicators, liquid shampoo is distributed to a spongelike roller which, in the process of rolling over the floor, is compressed and turns the liquid into foam. The roller then applies the foam to the nap surface.

In some instances, it has been found desirable to provide motive means to generate the foam and work it into the nap surface. One such device is disclosed in U.S. Pat. No. 3,602,933 entitled "Shampooer with Foam Generating Means." In that device, a crank mechanism reciprocates a brush into and out of squeezing beating engagement with a sponge at a substantial frequency, with the brush working the foam into the nap surface.

SUMMARY OF THE INVENTION

The present invention is directed to an improvement over the device of said U.S. Pat. No. 3,602,933, wherein the crank mechanism and vibratory forces due to the crank and reciprocating brush are eliminated. The device is less costly to manufacture and yet provides excellent high speed generation of a relatively dry foam, due to improved distribution of shampoo liquid before it is transformed to foam.

In accordance with this invention, a freely rotatable open cell sponge-like roller is disposed below the usual distributor for receiving shampoo in liquid form. A driven rotary brush is disposed adjacent the roller, with the brush bristles impinging upon and squeezing the roller to transform the shampoo from liquid to foam. The foam is carried by the brush to the nap surface and is worked into the nap by the brush.

DESCRIPTION OF THE DRAWING

The accompanying drawing illustrates the best mode presently contemplated by the inventor for carrying out the invention.

In the drawing:

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

FIG. 2 is a front end elevation of the device, with parts removed, broken away and in section; and

FIG. 3 is a longitudinal section through the device taken on line 3—3 of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in the drawing, the invention is embodied in a device for shampooing carpets and the like, which generally includes a manually operable handle 1, a liquid shampoo tank 2 secured to handle 1 and a frame-

like lower housing 3. Housing 3 includes an upper cover 4 and a lower platform-like portion 5.

The shampooer is supported for reciprocating movement over the 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 beneath housing portion 5.

The device includes a shampoo liquid supply means which includes tank 2 which connects through a conduit 8 to an elongated liquid distributor 9 secured to housing portion 5. Distributor 9 is provided with the usual series of openings 10 for liquid to pass downwardly through. Suitable well-known means, now shown, may be utilized for controlling flow of liquid shampoo from tank 2 to distributor 9.

Liquid passing through openings 10 is first converted to foam above surface 6 and then applied to said surface. For this purpose, and in accordance with the invention, an elongated roller 11 of polyurethane or other suitable compressible sponge-like open-cell material is disposed below distributor 9 and is parallel thereto and generally co-extensive therewith. Roller 11 is mounted for free rotation on housing portion 5, as by end bearings 12, for purposes to be described; and is adapted to receive shampoo in liquid form which drips down through openings 10.

Further in accordance with the invention, means are provided to rotationally engage and squeeze the peripheral portion of roller 11 to generate foam from the shampoo liquid. For this purpose, an elongated rotatable brush member 13 is disposed adjacent and in parallelism with roller 11 and with its axis disposed slightly downwardly and to one side of the roller axis. Member 13 is generally co-extensive with roller 11 and comprises a core 14 mounted on housing 5, as by end bearings 15, and a plurality of rows of brushes 16 secured to the core. As shown, the tufts of brushes 16 are mounted generally tangential to the surface of core 14, and are in helical rows.

The length of brushes 16 is such that they compressibly overlap the peripheral portion of roller 11. In other words, the combined radii of roller 11 and element 13 is greater than the distance between their axes.

Member 13 is rotatably driven by a motor 17 via a connecting belt 18. Motor 17 is mounted on housing portion 5 and is preferably designed to drive member 13 at about 600-700 r.p.m.

Operation of motor 17 will cause brush member 13 to rotate so that brushes 16 will squeezingly compress or knead the peripheral portion of roller 11. This will cause the shampoo liquid within the roller to be turned into foam 19 which will be squeezed out of the roller and carried by brushes 16 to surface 6. The brushes will then rotationally work the foam into surface 6, assisted by supporting rollers 7 as the device is translated over the surface. The helical form of the brush rows shown in the drawing will create a progressive continuous kneading action on roller 11.

The shampoo liquid dropping down onto roller 11 through openings 10 might tend to spread unevenly through the roller, if it was fixed. Therefore, as brushes 16 rotationally impinge on roller 11, they will cause the latter to spin in response thereto. The centrifugal force caused thereby will create a more even distribution of liquid in the roller and the liquid will be concentrated

in the peripheral area contacted by brushes **16**. This prevents roller **11** from becoming overloaded with unusable shampoo. In addition, the cooperative spinning of brush member **13** and roller **11** reduces friction therebetween to a minimum, thus substantially reducing wear. 5

Brush member **13** may rotate in either direction with equally good results.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention. 10

I claim:

1. In a device for applying liquid shampoo in the form of foam to a nap surface, the combination comprising: 15

- a. a liquid distributor,
- b. means to supply liquid shampoo to said distributor,
- c. a freely rotatable cellular compressible member disposed below said distributor for receiving liquid from said distributor,
- d. rotatable brush means disposed adjacent said member and with said brush means having bristles compressibly overlapping the peripheral portion of said freely rotatable member, 25
- e. and means to rotatably drive said brush means to thereby rotate and knead the peripheral portion of said freely rotatable member to create foam from said shampoo liquid. 30

2. 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. an elongated cellular compressible roller disposed below said distributor for receiving liquid from said distributor,
- d. a rotatable brush disposed adjacent said roller and with said brush having rows of bristles compressibly overlapping the peripheral portion of said roller,
- e. and means to rotatably drive said brush to thereby knead the peripheral portion of said roller to create foam from said shampoo liquid.

3. In the device of claim **2**: means to mount said roller for free rotation in response to rotation of said brush.

4. In the device of claim **2**: means to concentrate the said liquid shampoo in the peripheral portion of said roller during rotation of said brush.

5. The device of claim **4** in which said liquid concentrating means comprises: means mounting said roller for free rotation thereof in response to rotation of said brush so that centrifugal force will cause said liquid shampoo to be concentrated in said peripheral portion of said roller.

6. The device of claim **2** wherein the said rows of brush bristles are helical so that brush rotation causes a progressive continuous kneading action on said roller.

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