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SHAMPOING DEVICE INCLUDING FOAM GENERATING MECHANISM

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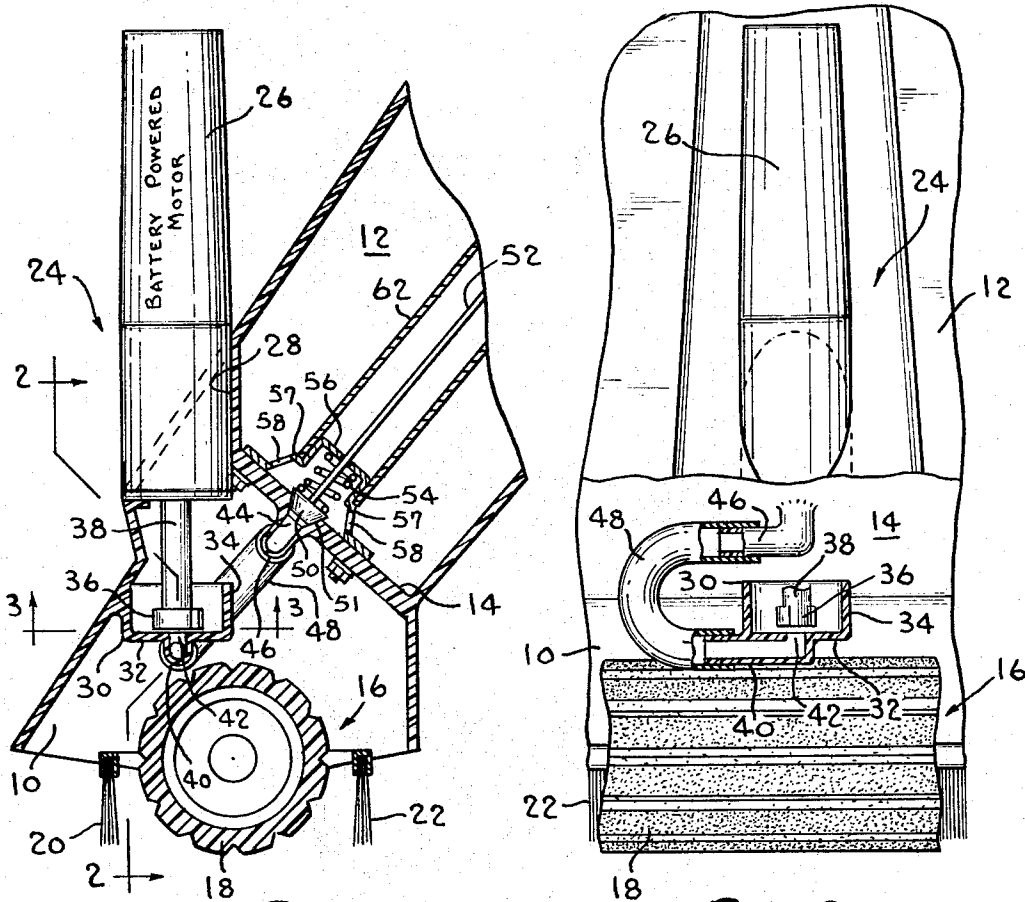


FIG. 1

FIG. 2

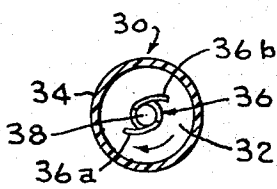


FIG. 3

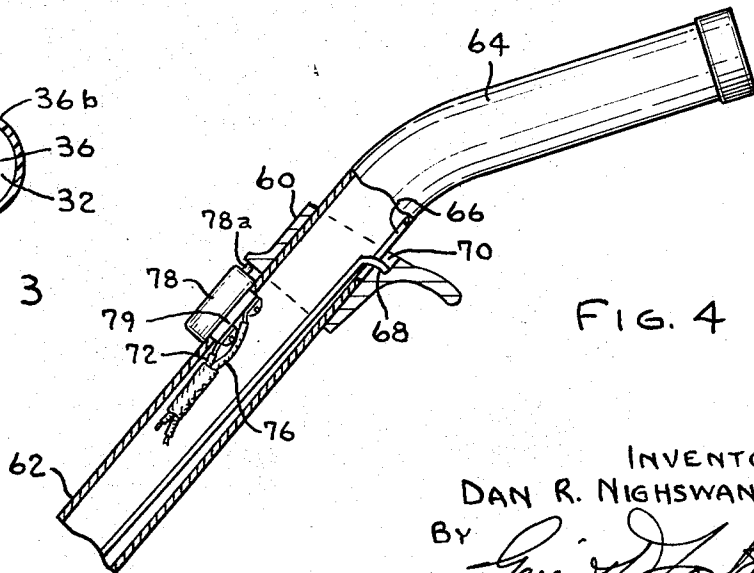


FIG. 4

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1

2

3,278,974

SHAMPOOING DEVICE INCLUDING FOAM GENERATING MECHANISM

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This invention relates to shampooing devices for rugs, carpeting, upholstery and the like and, more particularly, to a foam generating arrangement for such a device.

Shampooing devices, of suitable design, have gained recognition and acceptance for do-it-yourself household shampooing of rugs, carpeting, upholstery and the like. However, most present conventional designs rely on brush and roller action on the article being shampooed to generate the cleansing foam. In other words, the shampooing liquid is applied in liquid form to the rug or roller-brush assembly and is then agitated by the roller-brush assembly to produce a foam. This procedure has a tendency to wet the article being shampooed and although some wetting may occur in any shampooing operation it should be kept to a minimum so as not to require an unduly long drying time and as it generally has a detrimental effect on the article being shampooed.

An object of this invention is to convert the shampooing liquid to a foam state prior to application to the article being shampooed.

Various foam generating constructions have been proposed prior to this invention but such prior constructions have generally been limited to use in larger, commercial-type shampooers as opposed to the do-it-yourself household-type shampooers. This limitation on the use of such foaming constructions is due to a number of reasons one of which is their relative complexity which makes their incorporation in such do-it-yourself shampooers impractical from a cost standpoint. A further reason for this limitation has been the source of power required for the foam generators. For example, some devices require manual operation of the foam generator which is unsuited to shampooing as it interferes with a smooth and simple shampooing operation since it is difficult to manipulate both the shampooer and the foam generator at the same time so that either one of the operations must be suspended to achieve the other. Moreover, other devices although utilizing an electrically-powered generator have required connection to an external source of power thereby destroying a number of the basic advantages of a do-it-yourself shampooer, namely that it is compact, readily portable and manipulatable.

Accordingly, heretofore available foam generators have not lent themselves well to use in do-it-yourself shampooers as they have generally contained features which are directly contrary to the basic design considerations in household do-it-yourself shampooers which, for example, are that the shampooer be relatively low cost to put it within reach of the consuming public and that it be compact, readily portable and easily manipulated. Accordingly, another object of this invention is to provide a foam generator which is readily adaptable to such shampooers without adversely affecting its basic low cost construction, its compactness or its portability while still affording effective foam generation and shampooing.

A more specific object of this invention is to provide a foam generator which utilizes an internal, battery source of power as opposed to an external source of electrical power.

Other objects and advantages will be pointed out in, or be apparent from, the specification and claims, as will

obvious modifications of the embodiment shown in the drawings, in which:

FIG. 1 is a section view of the lower, article engaging portion of a shampooer incorporating this invention;

FIG. 2 is a view taken generally along line 2—2 of FIG. 1;

FIG. 3 is a section view taken generally along line 3—3 of FIG. 1; and

FIG. 4 is a partial view of the hand grip portion of the shampooer handle with parts broken away to expose a portion of the control mechanism.

With particular reference to the drawings, a portion of the shampooer body is illustrated in FIG. 1 and includes shroud 10 and reservoir 12 separated by wall 14. Roller-brush assembly 16 is of conventional construction, is supported from shroud 10 in a conventional manner (not shown) and includes rotatable roller 18 and relatively fixed brushes 20 and 22.

Reservoir 12 contains a suitable shampooing liquid and the shampooer includes foam generator 24 for converting the shampooing media from a liquid to a foam state prior to application to the article being shampooed. More particularly, the foam generator includes battery-powered motor 26 of conventional construction, for example it may comprise a suitable D.C. motor powered by rechargeable nickel cadmium batteries. The battery-powered motor is supported in recess 28 formed in the front face of the body of the shampooer. Foam cup 30 is connected to the inner surface of the front face of shroud 10 and is formed by bottom wall 32 and vertical walls 34 extending from the bottom wall. Agitator head 36 is positioned within the foam cup and arranged below the upper termination of cup walls 34. Drive shaft 38 extends from motor 26 into the shroud and is connected to agitator head 36 to impart rotation to the head when motor 26 is energized. Agitator head 36 can take any one of a number of suitable forms effective for foam generation, as illustrated in the drawings (particularly FIG. 3), head 36 includes a pair of arcuate blades 36a and 36b extending generally tangentially from mixer head 36 and effective to agitate the liquid shampoo and convert it to foam.

Foam cup 30 also includes hollow tube coupling 40 extending from an opening 42 formed in bottom wall 32 of the foam cup. Coupling 40 forms a part of a conduit arrangement connected between reservoir 12 and the foam cup for delivering liquid shampoo from the reservoir to the foam cup. To complete this conduit arrangement, opening 44 is provided in wall 14 and hollow tube coupling 46 extends from opening 44 with a length of flexible conduit 48 being engaged between couplings 40 and 46.

The foam cup is arranged vertically below reservoir 12 so that liquid from the reservoir flows naturally to and rises in the foam cup without the need for any auxiliary members. With liquid delivered to the foam cup, motor 26 can be energized to rotate agitator head 36 and convert the liquid to foam as it rises in the foam cup. The foam cup is preferably positioned over at least a portion of roller 18 so that the generated foam spills over the upper end of the foam cup onto the roller rather than directly onto the article being shampooed. Delivering the shampooing media in a foam state substantially reduces the amount of undesirable wetting of the article being shampooed and, moreover, by positioning the foam cup over the roller the undesirable wetting is further reduced since even in a foam state the shampooing media is not applied directly to the article being shampooed.

In operation foam is required only periodically during a shampooing operation so that a continuous supply of foam is not needed. This invention contemplates pro-

3

viding the shampooer with a control to afford the operator selective control over foam supply. More particularly, valve 50 is supported at opening 44 to selectively open and close the passage between the reservoir and the foam cup. Structurally, valve 50 is in the form of a truncated cone and opening 44 is provided with an angular surface 51 which serves as a seat for valve 50. Valve 50 is supported on valve stem 52 and is biased toward a closed position by coil spring 54 which is seated between valve 50 and bracket 56. Bracket 56 can take any suitable form as long as it does not unduly interfere with liquid flow to opening 44. As illustrated bracket 56 is generally U-shaped and its legs 57 are provided with openings 58 to achieve optimum flow of the shampoo liquid from the reservoir through opening 44 into the conduit passage.

Actual control over opening and closing of valve 50 is provided by actuator 60 slidably supported on handle 62 adjacent grip portion 64 of the handle. The handle is suitably connected to the reservoir, for example, extending into the reservoir and being fixedly attached to bracket 56. Valve stem 52 extends through the handle to slot 66 adjacent grip portion 64 and includes a turned end 68 extending through the slot and engaged in a notch 70 in actuator 60. Spring 54, in addition to biasing valve 50 in opening 44, biases end 68 into engagement with notch 70 and holds actuator 60 in the position illustrated in FIG. 4. The valve is opened to permit flow of shampooing liquid to the foam cup by moving actuator 60 upwardly toward hand grip portion 64 and, when the actuator is released, spring 54 returns the valve to its closed position.

Motor 26 can be suitably energized through any desired control arrangement to agitate the shampooing liquid as it enters the cup. Since motor energization is required only when shampooing liquid is present in the foam cup it is preferable that the motor be energized only at that time and this invention contemplates a control for the motor which energizes and de-energizes the motor simultaneously with opening and closing of valve 50, respectively. More particularly, leads 72 and 76 extend from motor 26 (motor connections being conventional and not shown) to snap switch 78 mounted on handle 62 adjacent actuator 60 by screws and bracket assembly 79. Switch 78 is of the normally closed type and with actuator 60 in the position illustrated in FIG. 4 button 78a of the switch is depressed and the electrical circuit of the motor and battery source is open. Movement of actuator 60 toward grip portion 64 to open valve 50 also releases switch button 78a actuating the switch and completing a motor circuit to thereby agitate the liquid which is being delivered to the foam cup with the valve being open. This arrangement has the particular advantage of energizing the motor only when liquid is being delivered to the foam cup thereby synchronizing motor energization with the supply of liquid. Moreover, the particular valve control arrangement affords the operator precise control over the amount of liquid furnished so that the liquid can be supplied in limited measured amounts as required and to insure proper conversion of all liquid to foam so that the shampooing media is delivered only in a foam state and that being a light, not highly saturated foam.

This invention provides a shampooer which is compact and completely self-contained. The shampooer requires no external power source, it is readily manipulated by the operator with only one hand so that shampooing can be accomplished in a smooth and continuous operation, and the foam generating arrangement insures effective conversion of liquid to foam and minimum wetting of the article being shampooed.

Although but one embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and modi-

4

fications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

What I claim is:

1. A shampooer comprising, in combination, a body,

a liquid reservoir in said body,

a roller-brush mechanism supported on said body for engagement with the article to be shampooed,

a foam cup connected to said body above and vertically aligned with at least a portion of said roller, said foam cup including a bottom wall and vertically disposed side walls extending around said bottom wall,

a foam generating agitator disposed in said foam cup below the upper end of said side walls,

a battery-powered motor supported on said body above said foam cup,

a drive shaft extending from said battery-powered motor toward said foam cup and connected to said agitator for imparting rotation thereto,

means defining an opening in the bottom wall of said foam cup,

conduit means connecting said foam cup opening to said reservoir and providing a passage for flow of fluid from said reservoir to said foam cup,

valve means operatively connected between said conduit means and said reservoir and selectively operable to open and close said conduit means to said reservoir,

and switch means connected to and controlling energization of said battery-powered motor.

2. The shampooer of claim 1 including a handle connected to said body and having a grip portion, and wherein said switch means is located operatively adjacent said handle grip portion.

3. The shampooer of claim 2 including an actuator mounted on said handle operatively adjacent said grip portion and connected with and operative to actuate said switch means,

and further including means connecting said valve means to said actuator for opening and closing said valve means simultaneously with energizing and de-energizing said motor.

4. The shampooer of claim 3 wherein said foam cup is disposed below said reservoir so that said liquid flows to and rises in said foam cup.

5. The shampooer of claim 4 wherein the opening in said foam cup bottom wall is vertically aligned below said agitator.

6. A shampooer comprising, in combination, a body including a reservoir, a handle and a roller-brush assembly support shroud,

a roller-brush assembly connected in said shroud and arranged for engagement with the article to be shampooed,

a foam generator including a foam cup disposed within said shroud and above at least a portion of the roller of said roller-brush assembly, a foam generating agitator disposed within said foam cup, and a battery-powered motor connected to and operative to rotate said agitator to generate foam,

conduit means connected between said reservoir and said foam cup and providing a passage for flow of liquid from said reservoir to said foam cup,

valve means operatively connected between said conduit means and said reservoir for selectively opening and closing said conduit means to said reservoir,

and switch means connected to and controlling energization of said battery-powered motor.

7. The shampooer of claim 6 including an actuator connected to both said valve means and said switch means and operative to energize and de-energize said motor simultaneously with operation of said valve means to open and close said conduit means to said reservoir.

5

8. A shampooer comprising, in combination,
 a reservoir,
 a roller-brush assembly,
 foam generating means including a foam cup disposed
 above at least a portion of said roller-brush assembly 5
 and a battery-powered foam generator having a ro-
 tatable agitator disposed within said foam cup and
 operative when energized to convert liquid in said
 foam cup to foam,
 and means for delivering liquid from said reservoir to 10
 said foam cup.

9. A shampooer comprising, in combination,
 a reservoir,
 a roller-brush assembly,
 a battery-powered foam generator operatively adjacent 15
 said roller-brush assembly for delivering foam to said
 roller-brush assembly for shampooing,
 and means for delivering liquid from said reservoir to
 said foam generator in limited, measured amounts for 20
 conversion to foam.

10. The shampooer of claim 9 including actuating
 means for said battery-powered foam generator and said
 liquid delivering means and operative to energize and de-
 energize said foam generator simultaneously with oper- 25
 ation of said foam delivering means to deliver and cut off
 the flow of liquid to said foam cup.

11. A shampooer comprising, in combination,
 a body,
 a liquid reservoir,
 a roller-brush mechanism supported on said body for 30
 engagement with the article to be shampooed,
 a foam cup,
 a foam generating agitator disposed in said cup,
 a battery-powered motor,
 means connecting said agitator to and for rotation by 35
 said motor,
 means defining a passage for liquid from said reservoir
 to said foam cup,
 and valve means operatively arranged between said
 reservoir and said passage defining means and selec- 40
 tively operable to open and close said passage with
 respect to said reservoir.

12. The combination of claim 11 including actuating
 means connected to both said motor and valve means

6

for energizing and de-energizing said motor simultane-
 ously with operation of said valve means to open and
 close said passage.

13. A shampooer comprising, in combination,
 a body,
 a roller-brush assembly supported on said body for
 engagement with the article to be shampooed,
 a battery-powered foam generator supported on said
 body and operative to deliver foam to a predeter-
 mined point with respect to said roller-brush assem-
 bly,
 a liquid supply operatively connected with said foam
 generator, and means for controlling energization of
 said foam generator.

14. A shampooer comprising, in combination,
 a body,
 a liquid reservoir,
 a roller-brush assembly supported on said body for
 engagement with the article to be shampooed,
 a battery-powered foam generator supported on said
 body adjacent said roller-brush assembly and oper-
 ative to deliver foam to the roller of said assembly,
 liquid supply means connected with said foam gen-
 erator and operative to deliver liquid to said foam
 generator in limited, measured amounts,
 and actuating means for controlling energization and
 deenergization of said foam generator.

15. The shampooer of claim 14 wherein said actuating
 means is connected to both said liquid supply means and
 said foam generator and operative to energize and de-
 energize said foam generator simultaneously with oper-
 ation of said liquid supply means.

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