July 3, 1962 W. P. WALLACE 3,041,644

RUG SHAMPOOING MACHINE

Filed Dec. 9, 1959

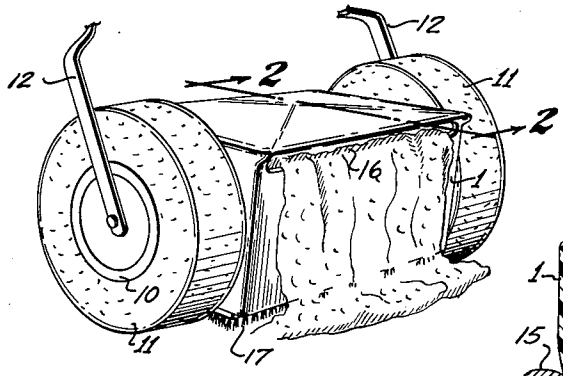


FIG. 1.

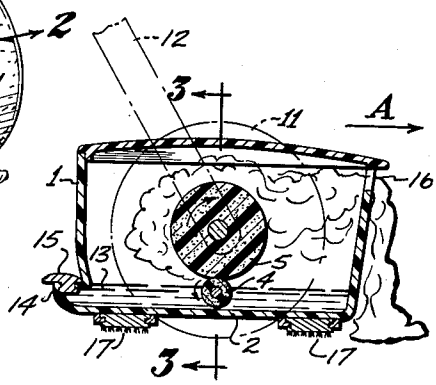


FIG. 2.

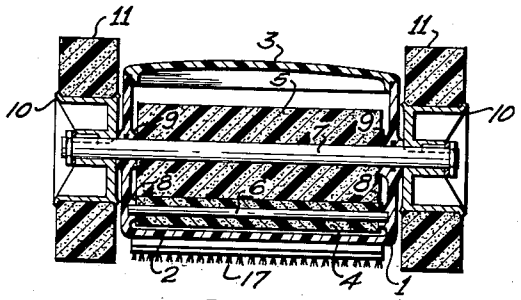


FIG. 3.

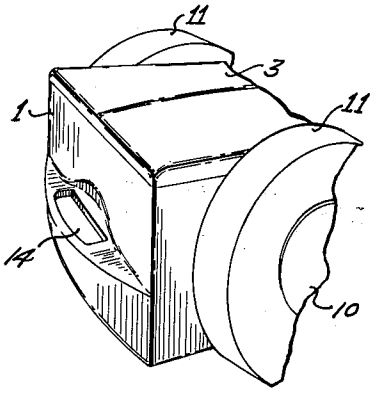


FIG. 4.

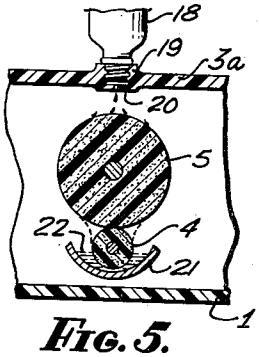


FIG. 5.

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RUG SHAMPOOING MACHINE

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This invention relates to a device for shampooing rugs and carpets, and relates more particularly to a device wherein foam is generated using a high foaming detergent, the detergent being aerated into foam prior to its application to the rug being cleaned.

In most currently available rug cleaning machines, a plurality of brushes, usually rotary, are provided to contact the rug or carpet. Above the scrubbing unit is a tank in which a water solution of detergent is maintained, the tank being provided with a valve mechanism which periodically releases a quantity of the cleaning solution on to the rug, whereupon the brushes act to work the solution into a lather for scrubbing. Rugs cleaned in this manner require many hours and even days to dry because of the penetration of moisture and water into the body of the rug. Mildewing and molding of the rug often results, together with the rusting of furniture ferrules which may permanently impair the appearance of the rug.

In order to overcome the difficulties inherent in the wet scrubbing or shampooing of rugs, carpets and the like, I have developed a unique device and procedure by means of which an essentially dry foam may be readily generated and applied as such to the carpet or the like being cleaned, whereupon the detergent foam is subjected to the action of scrubbing brushes effective to cleanse the rug without subjecting it to excessive moisture.

Accordingly, a principal object of the instant invention is the provision of a rug cleaning device wherein a concentrated detergent is aerated into essentially dry foam for application to a rug or the like to be cleaned.

A further object of the invention is the provision of novel foam generating means comprising a coacting pair of sponge-like members acting, in the presence of a liquid detergent, to generate large quantities of essentially dry foam.

Still a further object of the invention is the provision of a simple and inexpensive rug shampooing device capable of generating a large quantity of detergent foam, the construction of the device being such that the foam so generated will be applied to the rug being cleaned upon movement of the device in one direction, the device also incorporating means for effecting a scrubbing action on the rug or carpet.

Still a further object of the instant invention is the provision of a rug cleaning device of the character described incorporating driving wheels the rug contacting surfaces which are formed from a sponge-like material, such as polyurethane, thereby permitting the device to pass over a freshly cleaned rug without producing tracking marks.

The foregoing, together with other objects of the instant invention which will appear hereinafter or which will be apparent to the skilled worker in the art upon reading these specifications, I accomplish by that construction and arrangement of parts by those procedures which I shall now describe in certain exemplary embodiments.

Reference is now made to the accompanying drawings wherein:

FIGURE 1 is a perspective view of a rug shampooing device in accordance with the instant invention.

FIGURE 2 is a vertical sectional view taken along the line 2—2 of FIGURE 1.

FIGURE 3 is a vertical sectional view taken along the line 3—3 of FIGURE 2.

FIGURE 4 is a fragmentary perspective view looking towards the rear of the device.

FIGURE 5 is a fragmentary sectional view similar to FIGURE 2, but illustrating a modified form of the invention.

In accordance with the instant invention, I have found that large quantities of foam can be generated from a liquid detergent by the action of a pair of revolving sponge roller preferably mounted one above the other with their peripheries in flexing contact. The foaming action is at peak efficiency when one of the sponge rollers is at least partially submerged in the detergent and the other roller is positioned above the detergent. Where this condition exists, the foam flows continually as the rollers are revolved, and the foam which is generated is moved in the direction the rollers are turning.

Referring now to the drawings, I have therein illustrated a rug shampooing device incorporating the two roller foam generating principle just described. The device comprises a housing 1 preferably in the form of a generally rectangular receptacle having a closed bottom 2 and a removable cover 3. Journaled within the housing 1 is a lower sponge roller 4 and upper sponge roller 5, the rollers 4 and 5 being mounted on shafts 6 and 7, respectively. In the embodiment illustrated, the shaft 6 mounting lower sponge roller 4 is rotatably journaled in bearings 8 mounted on the opposite end walls of housing 1. Where the housing is formed from molded plastic or the like, the bearings 8 may be formed in part at least as integral parts of the housing. Similarly, the shaft 7 mounting upper sponge roller 5 is journaled in bearing 9, although in this instance the opposite ends of the shaft 7 project through the walls of the housing and mount drive wheels 10 which are preferably provided with wide rims mounting sponge tires 11. The unit is adapted to be propelled by a suitable push handle terminating at its lower end in a yoke 12 the ends of which are secured to the opposite ends of shaft 7. Thus, the wheels 10 serve both to propell the device and also to revolve the upper sponge roller 5, which in turn acts to drive the lower sponge roller 4 through frictional contact therewith. To this end, the peripheries of the roll will make line contact under sufficient pressure for the upper driven roller to drive the lower roller. At the same time, the peripheral contact of the two sponge rollers creates a flexing action of the sponge material as the rollers turn, which action serves to aerate the detergent and generate foam.

As best seen in FIGURE 2, the housing itself serves as a reservoir for a supply of liquid detergents 13 which may be conveniently introduced into the housing through filling opening 14 having a removable stopper 15. Since it is preferred that the level of the detergent 13 does not rise above the lower roller 4, the filling opening may be conveniently arranged in the rear wall of the housing so as to establish the desired level of fill. It will be understood, however, that other filling arrangements may be employed without departing from the invention.

It is also preferred that the upper sponge roller 5 be of larger diameter than the lower roller 4, although the relative dimensions of the two rollers do not constitute a limitation on the invention. However, where the upper roller is of substantially larger diameter, it functions more efficiently to move the foam which has been generated to the outlet opening 16 in the front wall of the housing. That is, as the device is pushed forwardly, in the direction of the arrow "A" seen in FIGURE 2, the roller 5 will be rotated in a clockwise direction and the foam which has been generated will be urged toward the outlet opening 16 from which it will flow downwardly on to the rug being cleaned. While foam will also be generated when the device is pulled rearwardly, the rollers will be rotated

in the opposite direction and the relatively large roller will tend to retain the foam within the housing.

The foam dispensed through the outlet opening **16** and deposited on the rug being cleaned will be subjected to the action of one or more scrubbing brushes **17** mounted on the under side of housing **1**. While in the embodiment illustrated these brushes are shown as being fixedly mounted to the housing **1**, it will be readily understood that rotary brushes of known character may be employed if desired, such brushes being driven by suitable gearing connecting them to the wheels **10** or else operatively connected to an independent source of power.

I have found that synthetic sponge material formed from polyurethane provides highly satisfactory rollers, and the same material is employed for the tires **11**. Where the tires are formed of such sponge-like material they do not track across the rug being cleaned. It will be understood, of course, that other forms of cellular blown or molded material may be employed for both the rollers and the tires.

In the operation of the device, the highly aerated essentially dry foam is deposited on the rug being cleaned upon forward movement of the device, whereupon the deposited foam is agitated by means of the brushes on the under side of the housing. The detergent foam acts to pick up dirt in the rug. After thorough scrubbing, the foam is permitted to remain on the rug till it has dried, whereupon the collected dirt is removed by a subsequent vacuum cleaning operation. Rugs shampooed in this manner remain essentially dry and are not subject to disadvantages attendant with the direct application of a liquid detergent solution to the rug. At the same time a material saving is effected in the amount of detergent required to clean a given rug. Tests have indicated that the dry foam procedure of the instant invention require as little as $\frac{1}{10}$ the quantity of detergent required to accomplish the same cleaning where the detergent is applied directly to the rug and the cleaning brushes are utilized to work the detergent into a lather.

Modifications may, of course, be made in the invention without departing from the spirit and purpose of it. For example, in FIGURE 5, I have illustrated a modification wherein the liquid detergent is adapted to be introduced from a bottle or other container **18** adapted to overlie the sponge roller **5** in inverted position. As illustrated, the upper wall or cover **3***a* of the housing is provided with an internally threaded fitting **19** into which the neck of the container **18** is screwed, the fitting **19** being provided with a restricted port **20** through which the liquid will drip onto the upper roller **5**. A pan **21** is positioned beneath the lower roller **4** and arranged to provide a pool **22** of detergent in contact with lower roll **4**. Other modifications and adaptations of the invention will undoubtedly occur to the skilled worker in the art, and consequently I do not intend to limit the invention except in the manner set forth in the claims which follow. Having thus described my invention in exemplary embodiments, what I desire to secure and protect by Letters Patent is:

1. In a rug shampooing device, a housing, a pair of wheels for moving said housing over a rug to be cleaned, scrubbing means mounted on said housing for contact with the rug, a pair of sponge roller rotatably journaled within said housing and mounted with their peripheries in flexing contact, means for rotating said rollers, and means for supplying a foamable liquid detergent to at least one of the said rollers, and an opening in said housing positioned to permit foam generated by said rollers upon rotation thereof in the presence of the foamable detergent to be dispensed from said housing onto the rug being cleaned.

2. Device claimed in claim 1 wherein said wheels have tires formed from sponge material.

3. The device claimed in claim 2 wherein said sponge rollers and said tires are formed from polyureathane.

4. In a rug shampooing device, a housing, a pair of wheels rotatably journaled to said housing for moving it over a rug to be cleaned, brush means mounted on the under surface of said housing for contact with the rug as the housing is moved thereover, a pair of sponge rollers rotatably journaled within said housing and mounted with their peripheries in flexing contact with each other, means for saturating at least one of said sponge roller with a foamable liquid cleaning agent, means for rotating said rollers in timed relation to each other so as to aerate the cleaning agent into foam, and a dispensing opening in said housing positioned to expel foam therefrom upon forward movement of said housing.

5. Device claimed in claim 4 wherein said sponge rollers are mounted one above the other, and wherein the uppermost of said roller is of larger diameter.

6. The device claimed in claim 5 wherein said wheels and said upper roller are mounted on a common shaft, whereby rotation of said wheels will effect rotation of said upper roller.

7. The device claimed in claim 6 wherein the lower roller is freely rotatable within said housing and is adapted to be driven by frictional contact with said upper roller.

8. The device claimed in claim 7 wherein said dispensing opening is in the front wall of said housing, and wherein said upper roller, upon forward movement of said device, is adapted to direct foam through said dispensing opening.

9. In a rug shampooing device, a housing mounting a pair of wheels by means of which said housing may be moved back and forth across a rug to be cleaned, scrubbing means mounted on the housing for contact with the rug, a pair of sponge rollers rotatably journaled one above the other within said housing and mounted with their peripheries in flexing contact with each other, the lowermost roller being of smaller diameter than the upper roller, means for rotating said rollers in timed relation, and means for supplying a foamable liquid cleaning compound to at least one of said rollers, said last named means including a pool forming receptacle underlying the lowermost roller and arranged so that said lowermost roller may be at least partially submerged in a pool of liquid cleaning compound maintained in said receptacle.

10. The device claimed in claim 9 wherein the means for supplying said liquid cleaning compound also includes a container overlying said uppermost roller and arranged to permit liquid contained therein to drip downwardly on said uppermost roller.

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