Sept. 6, 1960 S. D. HULSH 2,951,256

RUG SHAMPOO APPARATUS

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Fig. 1

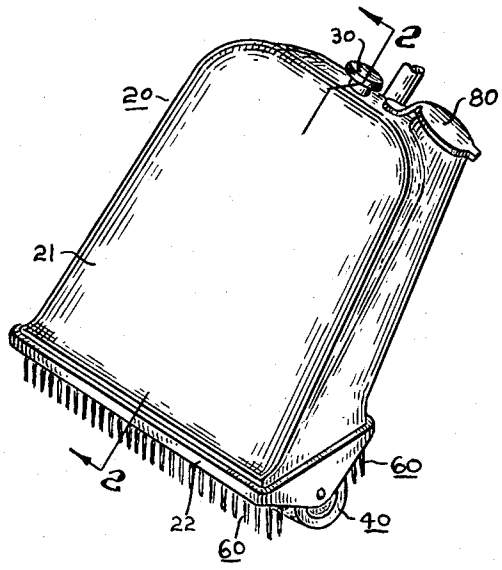

Fig. 3.

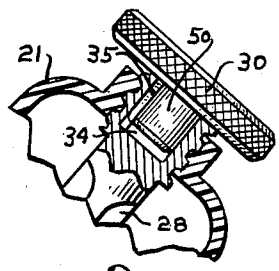

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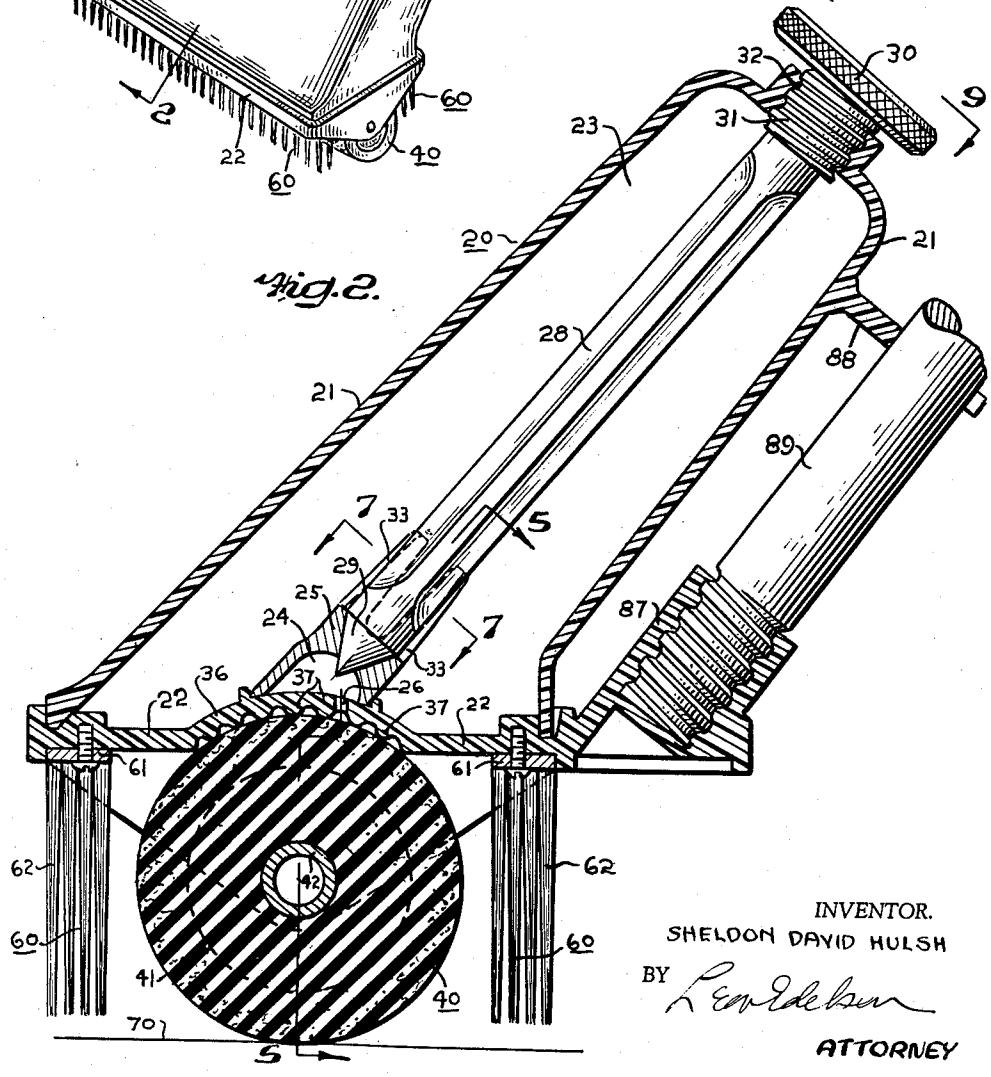
Fig. 2.



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RUG SHAMPOO APPARATUS

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Fig. 4.

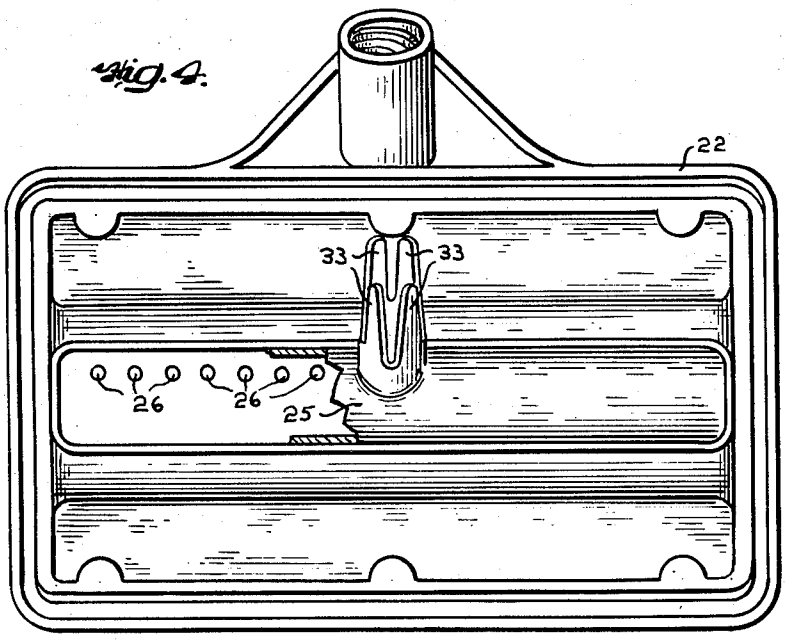

Fig. 5.

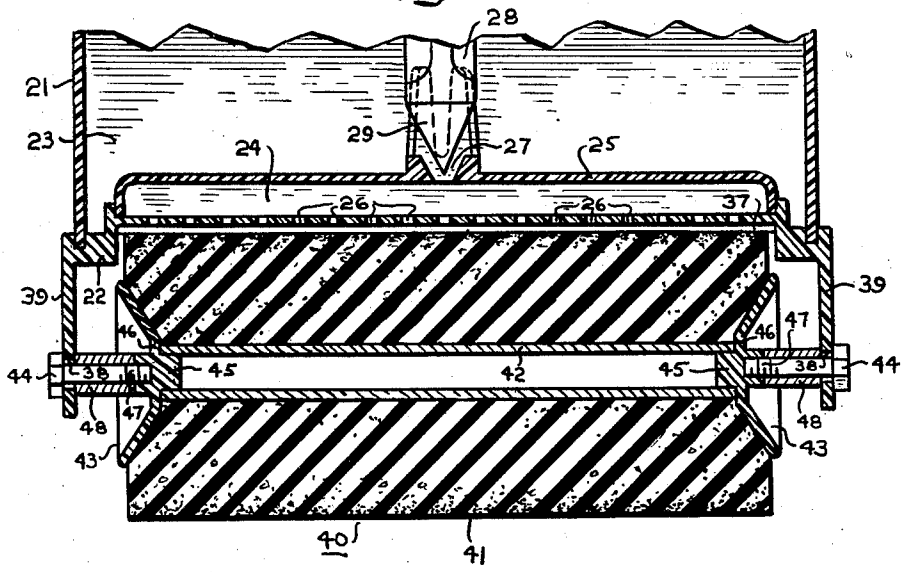

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Fig. 6.

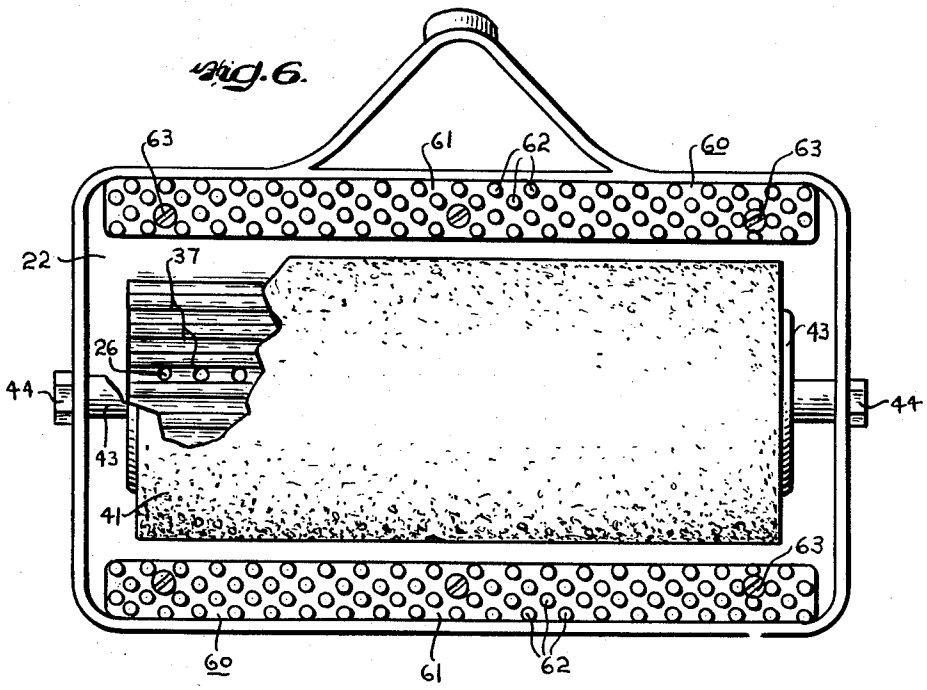


Fig. 7.

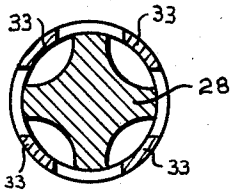


Fig. 8.

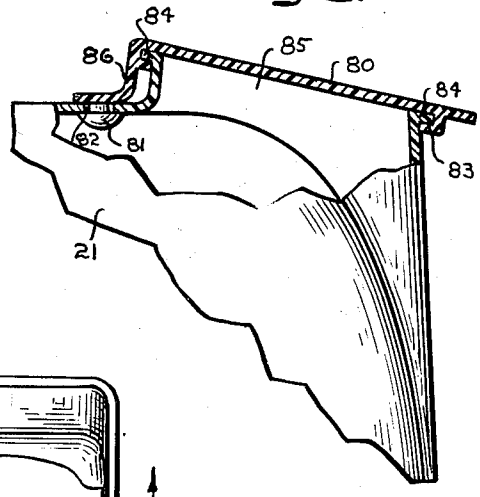
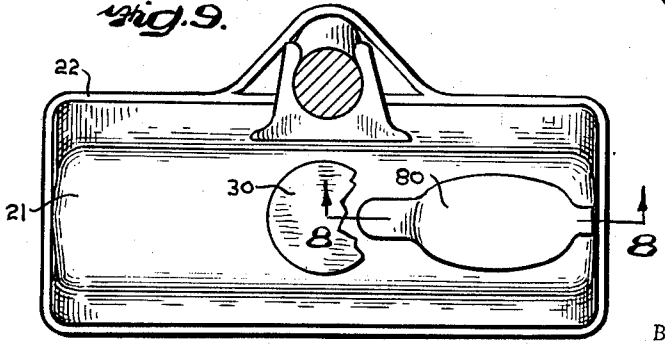


Fig. 9.



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RUG SHAMPOO APPARATUS

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6 Claims. (Cl. 15—124)

This invention relates to rug shampoo apparatus, and more particularly to apparatus which generates a cleaning foam from a foam-forming liquid and applies the foam to the rug which is to be cleaned.

In the past many types of rug shampoo apparatus have been known which suffer from one or more defects insofar as ease of use, efficiency of operation, and the avoidance of carpet wetting are concerned. Moreover, known types of rug shampoo apparatus have been bulky and heavy and thereby rendered generally unsuitable for home use by the housewife. Accordingly, it is a primary object of my invention to provide a novel rug shampoo apparatus which is physically compact, light in weight, and relatively inexpensive as compared to known types of rug shampoo apparatus.

Another important object of my invention is to provide a novel rug shampoo apparatus which converts a foam-forming solution into a relatively dry foam and applies the latter directly to the surface to be cleaned, thereby avoiding the highly undesirable situation in which a wet cleaning agent is applied to the rug.

Yet another object of my invention is to provide a rug shampoo apparatus containing a minimum number of parts, being easily cleanable, simple to operate, and having a long useful life expectancy.

The foregoing and other objects of my invention will become apparent from a careful reading of the following specification when taken in conjunction with the appended drawings, wherein:

Figure 1 is a perspective view of the rug shampoo apparatus according to my invention and shows a foam-forming solution storage tank with an underlying roller and brushes disposed to the front and rear of the latter;

Figure 2 is a side sectional view taken along the lines 2—2 of Figure 1 and illustrating the major internal constructional details of the rug shampoo apparatus;

Figure 3 is a fragmented view illustrating the manner of connecting the valve stem to the valve operating handle;

Figure 4 is a top view of the rug shampoo apparatus with the tank removed to show the valve seat communicating with the underlying manifold, the upper wall of the latter being partially broken away to reveal the manifold distributing ports;

Figure 5 is a sectional view of the rug shampoo apparatus as seen when viewed along the lines 5—5 of Figure 2;

Figure 6 is a bottom view of the rug shampoo apparatus with the roller partially fragmented away to show the manifold ports which communicate with the roller surface;

Figure 7 illustrates the sectional view taken through the valve stem and valve seat upwardly projecting fingers as viewed along the lines 7—7 of Figure 2;

Figure 8 illustrates partly in section and partly in elevation the tank closure cap as viewed along the lines 8—8 of Figure 9;

Figure 9 illustrates a plan view of the rug shampoo apparatus when viewed along the lines 9—9 of Figure 2.

In the several figures, like elements are denoted by like reference numerals.

Turning now to an examination of the figures, and primarily to Figures 1 and 2, it will be seen that the rug shampoo apparatus according to my invention consists of three main functional portions. These portions are the storage tank 20, the foam-roller assembly 40, and the brushes 60 disposed to the front and rear of the roller assembly 40 and mounted to the underside of the tank assembly 20. Considering first the tank assembly 20, this is seen to comprise a main housing portion 21 seated upon and sealed about its lower periphery to a base section 22, to form a storage enclosure 23 for containing the foam-forming solution which is fed to the foam-forming roller assembly 40 in the manner subsequently to be described. As illustrated, the main housing portion 21, and the base portion 22 are each unitarily formed, as for example from molded plastic, but may be fabricated in any convenient manner to provide a liquid-tight storage chamber 23.

Disposed within the main housing portion 21 but isolater from the liquid storage chamber 23 is a manifold chamber 24. The manifold chamber 24 is defined by a member 25 which extends across the interior width of the tank 20 and which is seated upon and sealed to the underlying upper surface of the tank base section 22. A series of laterally spaced holes 26 which extend through the base member 22 and which are sealed off from the main tank chamber 23 by the member 25 provide communication between the manifold chamber 24 and the surface of the underlying roller 41. The manifold-chamber forming-member 25 and the plurality of apertures 26 may also be seen in the illustrations of Figures 4 and 5.

In order to transmit and control the flow of the liquid cleaning agent which is stored in the main chamber 23 to the roller 41 through the manifold 24, there is provided a conical valve seat cut through the upper wall of the member 25 which provides communication between the main storage chamber 23 and the manifold chamber 24. A fluted valve stem 28 fitted with a conical lower end 29 complementally shaped to fit snugly within the conical seat 27 fashioned in the manifold member 25 extends from its bottom end at the manifold member 25 upwardly and through the top wall of the main body portion 21 of the tank portion 20 and terminates exteriorly of the tank in a valve regulating handle 30. The valve stem 28 is spirally threaded as at 31 to engage the threads 32 formed in the top tank wall where the valve stem 28 passes through the latter. By means of the handle 30 and threads 31 and 32 the valve stem 28 may be rotatably advanced or retracted to thereby cause the conical end 29 to firmly seat in the conical seat 27 of the member 25 or alternatively to provide any desired clearance therebetween.

When the cone 29 is fully seated, the valve is shut and the liquid cleaning agent stored in the chamber 23 may not pass therethrough to the manifold chamber 24, and hence is prevented from being applied to the roller 41 through the manifold ports 26. When, however, the valve is opened by rotation of the knob 30 to provide a clearance between the cone 29 and its seat 27, the liquid cleaning agent stored within the chamber 23 may pass between the cone and seat into the manifold chamber 24 and hence to the roller 41 through apertures 26. The rate of flow of the cleaning agent from the main storage chamber 23 to the manifold chamber 24 is of course controlled by the degree of clearance between the cone 29 and the seat 27, and hence is controlled by

the degree of rotation of the valve handle 30. In order to assist in seating the valve cone 29 into the seat 27 when the valve stem 28 has been removed from the tank for one reason or another, the manifold member 25 is provided with a plurality of upwardly extending guide fingers 33 disposed about the conical seat 27 on a circle whose axis is co-axial with the conical axis of the seat. In those cases where it is not feasible to unitarily form the valve stem 28 and control handle 30, the valve stem 28 may be socketed as at 34 in Figure 3 and the handle stem 50 may be seated therewithin in non-rotatable fashion by employing a spline 35 and a bonding agent. As in the case of the tank parts 21 and 22, the manifold member 25 and valve assembly may also be formed of molded plastic parts.

Before turning to an examination of the roller assembly 40 it should be noted that the base member 22 of the tank 20 is formed with a ribbed central section 36 extending substantially the width of the base member 22 and formed along the arc of a circle disposed in overlying engagement with a portion of the cylindrical surface of the roller 41. This central section 36 is formed with a plurality of ribs 37 which engage the surface of the roller 41 and provide a washboard or corrugated type of surface. When, during operation, the liquid cleaning agent passes downward through the manifold apertures 26 and onto the surface of the roller 41, it is seen that the cleaning fluid can not run down onto the underlying carpet but is trapped between the ribs 37 on either side of the apertures 26 and the roller itself. Hence, even when the rug cleaning apparatus is not being rolled across a carpet, the carpet does not become soaked with the cleaning fluid. When now the rug shampoo apparatus is rolled forward or back, the cleaning liquid in and on the surface of the roller 41 is mechanically agitated into a relatively dry foam as the roller mechanically rubs past the ribs 37. Of course, the cleaning liquid in such case is continuously applied to the roller 41 through the manifold apertures 26 and a continuous supply of foam is generated and carried downward by the roller for application to the underlying carpet. The rate of foam generation is of course controlled by the rotational speed of the roller 41 and the rate at which the cleaning liquid is permitted to pass from the storage chamber 23 through the valve and into the manifold chamber 24, this flow rate being of course controlled by rotation of the regulating handle 30 secured to the valve stem 28.

Turn now to an examination of the roller assembly 40, the details of which may be best seen in the showing of Figure 5. The roller assembly 40 is seen to consist of six parts, a roller 41, a hollow axle 42, a pair of hubs 43 disposed at opposite ends of the roller 41, and a pair of bolts 44 threadedly engaged with the hubs 43. The roller 41 may be made of sponge or foam rubber or any other suitable absorbent substance, and the axle 42, hubs 43 and bolts 44 may be fashioned from molded plastic or metal. The roller assembly 40 is assembled by first slipping the axle 42 into an axially extending hole through the roller 41, the axially extending hole being of sufficiently small diameter to provide a snug fit with the axle 42. The hubs 43 are then assembled into the axle and roller structure by projecting the hub bosses 45 into the open ends of the axle 42 until the axle end surfaces abut the hub shoulders 46. The roller assembly 40 is then positioned as shown in Figure 5 and the securing bolts 44 are projected through holes 37 located in the depending side flanges 39 which are shown as unitarily formed with the bottom section 22 of the tank 20. The ends 47 of the bolts 44 are then threadedly engaged with the inside of the outwardly extending axially aligned axle continuation portions 48 of the hubs 43. It should be noted that the shanks of the bolts 44 are of smaller diameter than the holes 38 in the depending flanges 39 through which the bolt shank passes, so that the bolt and hence the entire roller assembly is freely rotatable within the holes 38. In operation, the roller 41, axle 42, hubs 43, and bolts 44 rotate as a unit.

Turning now to Figures 6 and 2 for details of the third functional portion of the rug shampoo apparatus, namely the brush assemblies 60, it is seen that each brush assembly 60 includes a base 61 having set therein and projected downwardly a plurality of bristles or teeth 62. The base member 61 and the bristles or teeth 62 may be made in any convenient fashion. While it has been found in practice that it is possible to mold the brush assembly 60 unitarily so that the base 61 and the teeth are unitarily formed, as for example from polyethylene plastic, this assembly may be just as readily formed of a separate base member 61 having bristles or teeth 62 set therein. Moreover it may be found desirable to form one of the assemblies, for example the front assembly, with spaced relatively-stiff comb-like teeth or fingers, while forming the other assembly with tufts of finer and somewhat more flexible bristles arranged with the tufts in such closely associated relation that the bristles thereof form in effect a brush extending completely across the unit immediately to the rear of the roller 41. In such a case the comb-like stiffer teeth or fingers accomplish deep cleaning whereas the softer tufted brushing bristles provide better surface cleaning and also groom the rug or carpet by brushing out any furrows which may tend to be formed by the stiff fingers. Each of the brush assemblies 60 is secured to the bottom section 22 of the tank 20 in the manner illustrated by a plurality of screws or machine bolts 63. As best seen in the view of Figure 2 the teeth 62 of the brush assemblies 60 extend downwardly from the base 22 of the tank 20 but stop short of engagement with the carpet surface 70.

In operation, the roller may be moved back and forth generating foam and applying it to the underlying carpet while maintaining the brush bristles 62 out of contact with the carpet. When sufficient foam has been applied to the carpet the brush assemblies may be brought into contact therewith by tilting the operating handle either forward or backward to respectively engage the front or rear brush with the carpet thereby providing a brushing or combing action which works the foam substantially into the nap to provide maximum cleaning efficiency. Alternatively, either or both of the brushes may be engaged with the carpet simultaneously with the generation and application of foam by either tilting the handle as aforedescribed or bearing down on the handle to compress the sponge roller on its undersurface and thereby lower the brushes into contact with the carpet.

Turning now to Figure 8 there is seen a detail of the tank closure cap 80 which is secured to the top wall of the tank portion 20 by an integrally formed button 81 projected through a hole 82 in the tank top wall. The closure cap 80 is also formed with an inwardly projecting lip 83 which locks under an outwardly projecting circumferentially extending lip 84 formed at the top of the tank filling opening 85. As in the case of the other parts, the tank closure cap 80 may be formed of a plastic material having a flexible portion 86 bridging between the closure portion of the cap and the fastening button. Finally, Figure 2 illustrates the manner in which a conventional type of handle may be readily secured to the rug shampoo apparatus for operation thereof. As shown, a threaded socket 87 is molded with the base section 22 of the tank 20, and a support clip 88 is molded onto the back wall of the main portion 21 of the tank 20. Assembly of the handle 89 to the tank 20 is carried out by projecting the threaded end of the handle downward through the support clip 88 and into threaded engagement with the socket 87.

Having now described my invention, it will be understood that various changes and modifications will naturally occur from time to time to those persons normally skilled in the art without departing from the essential

spirit or scope of my invention, and it is therefore intended to claim the same broadly as well as specifically as indicated by the appended claims.

What is claimed as new and useful is:

1. In a rug shampooing apparatus, the combination comprising, a chamber for storing a foam-forming solution, a manifold chamber having a bottom wall the external surface of which is transversely curved, valve means connecting said storage chamber with said manifold chamber and effective to control the rate of flow of foam-forming solution therebetween, a rotatable cylindrical roller having a pliant, solution-absorbent surface directly underlying said manifold chamber, the cylindrical surface of said roller being curved in correspondence with the transverse curvature of and in surface engagement with the curved external surface of the manifold chamber bottom wall, said manifold chamber bottom wall being apertured within the area of its surface engagement with said roller to provide free communication between the interior of said manifold chamber and the surface of said roller so that foam-forming solution may pass directly to the roller surface from the manifold chamber while the roller surface provides a closure which prevents the foam-forming solution from flowing freely out of the manifold chamber and down onto the surface underlying said roller, the said curved external surface of the manifold chamber bottom wall being formed to provide a plurality of laterally spaced parallel ridges having the long dimension of each ridge oriented transversely to the rotational plane of said roller with the ridge crests in contact with the roller surface, whereby foam-forming solution applied to the roller surface from the manifold chamber is frothed into a foam as it is rubbed transversely across the ridges due to the roller rotation.

2. The combination according to claim 1 wherein said manifold chamber bottom wall is apertured in the trough between a pair of said laterally spaced parallel ridges formed on the curved external surface thereof.

3. In a rug shampooing apparatus, the combination comprising, a chamber for storing a foam-forming solution, a manifold chamber having a bottom wall the external surface of which is transversely curved, valve means connecting said storage chamber with said manifold chamber and effective to control the rate of flow of foam-forming solution therebetween, a rotatable cylindrical roller having a pliant, solution-absorbent surface directly underlying said manifold chamber, the cylindrical surface of said roller being curved in correspondence with the transverse curvature of and in surface engagement with the curved external surface of the manifold chamber bottom wall, said manifold chamber bottom wall being apertured within the area of its surface engagement with said roller to provide free communication between the interior of said manifold chamber and the surface of said roller so that foam-forming solution may pass directly to the roller surface from the manifold chamber while the roller surface provides a closure which prevents the foam-forming solution from flowing freely out of the manifold chamber and down onto the surface underlying said roller, the said curved external surface of the manifold chamber bottom wall being formed to provide a plurality of spaced projections in contact with and adapted to exert a squeezing action upon the pliant surface of said roller upon rotation thereof, to thereby froth into foam the foam solution applied to said roller surface.

4. The combination according to claim 3, wherein said valve means is a manually operable valve continuously adjustable between a fully closed condition and a preselected maximally open condition, said valve at least partially controlling the rate of transfer of foam-forming solution from said solution-storing chamber to said manifold chamber when said valve is open.

5. The combination according to claim 3 further including massaging means for working the foam into the surface underlying said roller means when the roller means has deposited the foam upon such structure.

6. The combination according to claim 5 wherein said massaging means comprise a pair of brushes, one of said brushes being positioned in advance of said roller means and the other being positioned to the rear thereof.

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