April 19, 1966 R. A. YONKERS 3,246,360

ROLLER APPLICATOR FOR APPLYING DETERGENT TO RUGS AND THE LIKE

Filed Feb. 28, 1964

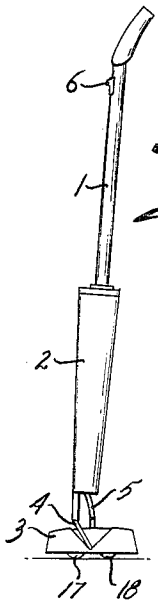



Fig. 1.

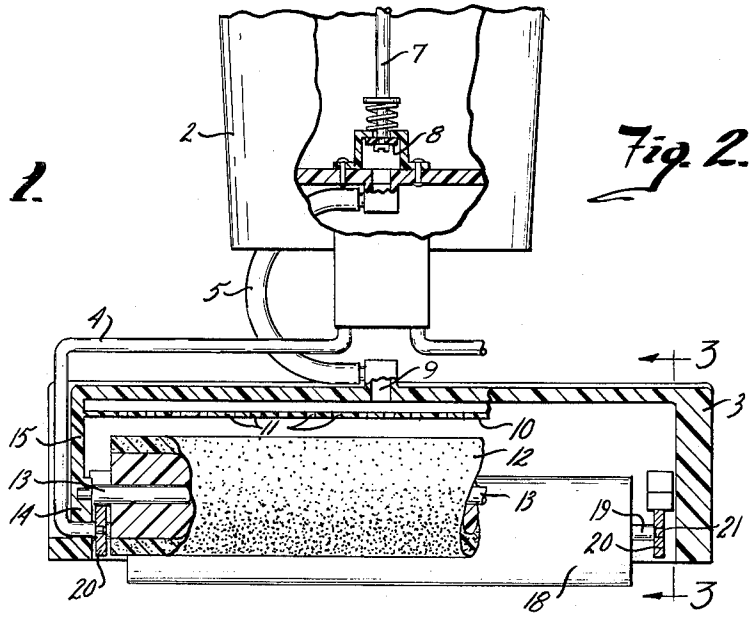



Fig. 2.

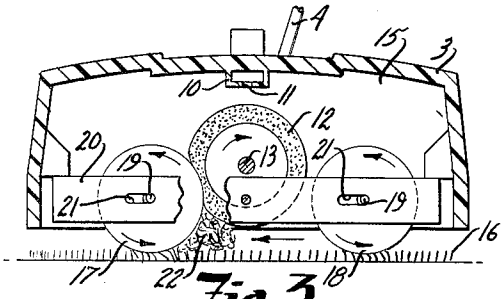



Fig. 3.

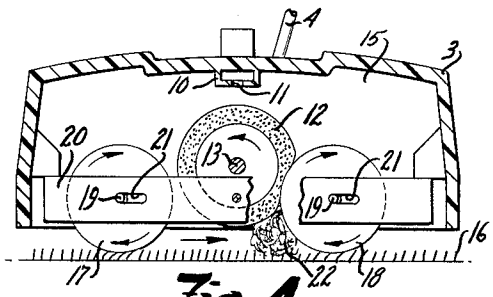



Fig. 4.

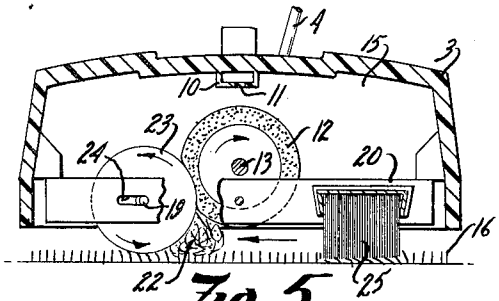



Fig. 5.

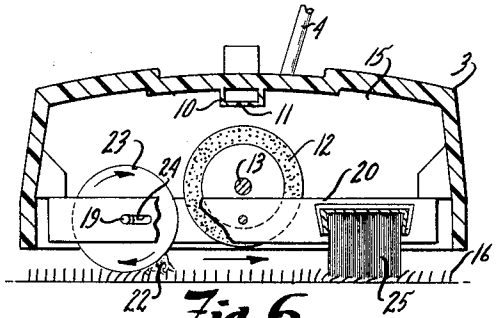



Fig. 6.

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# ROLLER APPLICATOR FOR APPLYING DETERGENT TO RUGS AND THE LIKE

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6 Claims. (Cl. 15—533)

This invention relates to an apparatus for cleaning nap surfaces, and more particularly to a rug or carpet cleaning mechanism including means for generating a foam which is employed as the nap cleaning agent.

In recent years manual devices for rug cleaning, whereby the housewife may quickly and easily perform what was once a laborious task, have become popular. Hundreds of thousands of such units have been and continue to be sold throughout the world, testifying to the great need for them. One of the most successful rug cleaning devices has been marketed by the assignee of the present invention and is disclosed and claimed in Yonkers et al. Patent No. 2,975,462 entitled "Apparatus for Applying Detergent to Rugs and the Like."

The present invention constitutes an improvement on the device shown in the above mentioned patent, and on others owned by the assignee. Generally, it is directed to a device for cleaning nap surfaces wherein the detergent foam is produced above the nap by contact between a detergent-charged roller and a member pressed against the roller. More specifically, the member is automatically moved into and out of pressure contact with the roller in accordance with the direction of translation of the device over the surface to be cleaned.

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

In the drawings:

FIGURE 1 is a side elevation of a device constructed in accordance with the invention;

FIG. 2 is an enlarged partial front elevation of the device with parts broken away and in section;

FIG. 3 is a transverse section taken on line 3—3 of FIG. 2 and showing the position of parts during forward translation;

FIG. 4 is a view similar to FIG. 3 and showing the position of parts during rearward translation;

FIGS. 5 and 6 are views similar to FIGS. 3 and 4 respectively, and showing a different embodiment of the invention.

As shown in the drawings, the invention may be incorporated in a rug cleaning apparatus comprising a manually operable handle 1, a liquid receiving tank 2 secured to the lower end of the handle, and a generally elongated frame-like lower housing 3 pivotally carried by a bail 4 secured to a projection extending downwardly from the tank.

Tank 2 is adapted to receive and contain a water-detergent mix constituting a liquid cleaner and is shown as connected to housing 3 by a conduit 5 providing selective flow of the liquid cleaner to the lower part of the apparatus. Control of such flow by the operator may be by a finger-tip lever 6 mounted on the upper portion of handle 1 and which is connected by a rod 7 to a suitable valve 8 mounted in the bottom of tank 2 at the upper end of conduit 5. Manual actuation of lever 6 will open valve 8 to permit the liquid detergent mix to flow through the conduit.

The lower end of conduit 5 discharges through an opening 9 into an elongated distributor channel 10 provided centrally beneath the top of housing 3 in any suitable manner. Channel 10 is provided with a plurality of liquid discharge openings 11 for purposes to be described.

The design of the above-described liquid supply means



may be varied without departing from the spirit of the present invention. For example, the tank may form a direct upward extension of the housing, as in Patent No. 2,975,462 so that the conduit is eliminated and the valve disposed in the housing itself. Also, the selective liquid flow control may be automatic in accordance with translatory movement of the apparatus, as in Yonkers et al. Patent No. 3,085,284 entitled "Applicator Machine." Other variations, such as in the valve and distributor channel, may come to mind, the construction shown being illustrative only.

Liquid passing through discharge openings 11 drops onto a roller 12 having a hard core covered with a sponge-like resilient compressible yieldable material such as polyurethane of substantial radial thickness. The covering of roller 12 is of a type to absorb or hold the liquid water-detergent mix in its pores, and is mounted for rotation about its fixed axis by a support shaft 13 mounted in end journal bearings 14 secured to the inner faces of housing end walls 15.

In the embodiment of FIGS. 1–4, roller 12 is supported by bearings above and out of contact with the nap surface 16 to be cleaned. A pair of freely rotatable horizontally spaced preferably hard-surfaced rollers 17 and 18 serve to support the entire apparatus for translation on the nap surface. For this purpose, the axles 19 of rollers 17 and 18 are supported by opposed frame members 20 which are fixedly secured to the respective end walls 15 of the housing.

The liquid water-detergent mix held in the pores of resilient roller 12 is adapted to be formed into a foam for application to nap surface 16 and subsequent cleaning action. In accordance with the invention, the foam is generated above surface 16 to prevent possible overloading of the surface with foam or small droplets of liquid. In addition, the foam is then pressed downwardly into the nap and worked into the surface to clean it. This is accomplished by making rollers 17 and 18 free-floating and causing them to alternatively deform roller 12 to generate the foam.

As best shown in FIGS. 3 and 4, axles 19 are mounted for limited sliding movement in horizontal slots 21 provided in frame 20. Slots 21 are of a length to permit rollers 17 or 18 to either engage and deform resilient roller 12 or to be substantially free therefrom.

FIG. 3 shows the device being translated over nap surface 16 in a forward direction (toward the left). As this occurs, frictional engagement of the supporting rollers 17 and 18 with the nap will effect counterclockwise roller rotation and will cause both rollers to move rearwardly to the right in housing 3 with their axes parallel to each other and to the axis of roller 12. Leading roller 17 will move toward and into driving and deforming contact with resilient roller 12, causing upwardly directed rolling contact therebetween and generation of foam 22 which is squeezed out and tends to fill the space beneath the area of contact of the rollers forwardly of the axle of roller 12. As the apparatus continues its forward movement, the trailing (or right hand) roller 18 is disposed away from roller 12 and comes in contact with the trailing portion of generated foam beneath and behind the axle of roller 12 and causes the foam to be compressed and spread beneath roller 18 and upon nap surface 16 and worked into the nap. The downwardly traveling leading face of rotating roller 18 assists in pulling the light foam downwardly into the nap.

Upon subsequent rearward translation of the apparatus, the rollers 17 and 18 move to the other ends of their respective slots 21 and reverse positions, directions of rotation and functions. As shown in FIG. 4, roller 18 is now leading and engages and deforms the sponge surface of resilient roller 12 to generate foam 22. Roller 17 has

separated from and trails roller 12 and works the generated foam into the nap.

In operating this embodiment, the housing 3 tends to become full of foam in time and both rollers will then continuously function to apply foam to the nap surface.

In some instances, it may be possible to eliminate one of the hard rollers. Thus, FIGS. 5 and 6 show a device wherein central roller 12 is supported above and out of contact with nap surface 16 by a single rotatable roller 23 mounted for limited fore and aft movement in slots 24. Upon forward (leftward) translation of this device (FIG. 5) roller 23 engages and deforms roller 12 to generate foam 22. Upon rearward (rightward) translation (FIG. 6), roller 23 separates from roller 12.

In operating this embodiment the roller 23 will apply foam to the nap during continued back-and-forth translation of the device over surface 16.

A brush 25 is disposed to support the housing on the side opposite the roller 23, and serves to orientate the nap and assist in working the foam thereinto.

If it is desired to provide foam generation in both directions of translation of this embodiment, the slots 24 may be eliminated and the end trunnions of roller 23 may be mounted in fixed journal bearings which maintain the roller in the position illustrated in FIG. 5 in which the roller 23 will continuously deform the sponge surface of roller 12.

The invention provides a novel apparatus for cleaning nap surfaces, wherein foam is generated by deforming action of a member on a detergent-holding sponge-like porous roller above the nap. In the preferred embodiment, reciprocal translation of the device causes the deforming member to move generally horizontally and parallel to the direction of translation into and out of engagement with the porous roller.

By employing freely rotatable rollers with a rotating surface bearing against and deforming the sponge surface of the roller 12 the friction involved is reduced to a minimum for deforming the sponge roller.

While it is possible to employ a sponge or other soft surface for rollers 17, 18 and 23, particularly to reduce any tendency to slide on the rug, it has been found to be satisfactory to employ hard surfaced rollers and they are generally less costly.

The bail 4 is preferably pivoted to housing 3 intermediate the axles 19 of rollers 17 and 18 so that the handle 1 serves to apply weight or pressure to both rollers upon the rug. In the embodiment of FIGS. 5 and 6 the brush 25 takes the place of a roller in supporting the device and cooperates with roller 23 for this purpose. The arrangement of the bail 4 in this construction is the same as in the embodiment of FIGS. 3 and 4.

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.

I claim:

1. In a manually operable device for applying and spreading a foam upon nap surfaces for cleaning the same:
- (a) a frame,
- (b) a handle carried by said frame and adapted for manual manipulation in translating said frame forward and back over adjacent portions of the surface to be cleaned,
- (c) a pair of spaced generally hard surface rollers supporting said frame for said translatory movement,
- (d) a foam generating resilient roller journalled in said frame and disposed generally between said first named rollers and out of contact with the nap surface,
- (e) means under the control of the operator for applying selected amounts of liquid detergent to said resilient roller,
- (f) and means mounting said first named rollers in said frame for free rotation thereof by the surface being treated during said translation and for limited movement toward and away from said resilient roller depending upon the direction of translation at any given time,
- (g) said mounting means providing for deformation of said resilient roller and rotational driving of the same by the leading hard surfaced roller in either direction of translation to effect foaming of said detergent and application of the foam to the nap surface.



2. In a manually operable device for applying and spreading a foam upon nap surfaces for cleaning the same:
- (a) a frame,
- (b) a handle carried by said frame for manipulation of the latter in translation forward and back over portions of the nap surface to be cleaned;
- (c) a first roller supporting said frame for translation upon the nap surface,
- (d) a second roller journalled in said frame on a fixed axis and disposed adjacent said first roller and out of contact with the nap surface,
- (e) means under the control of the operator for applying selected amounts of liquid cleaning fluid to said second roller,
- (f) and means mounting said first roller in said frame for free rotation thereof by the surface being treated during said translation,
- (g) at least one of said rollers having a resiliently compressible deformable porous surface material thereon,
- (h) said first roller being mounted so that its axis can freely move parallel to the direction of translation of the device over the said surface,
- (i) the position of said mounting permitting movement of said first roller into deforming driving engagement with said second roller during translation of said device in one direction, and permitting movement of said first roller out of engagement with said second roller during translation of said device in the other direction.

3. In a manually operable device for applying and spreading a foam upon nap surfaces for cleaning the same:
- (a) a frame,
- (b) a handle carried by said frame for manipulation of the latter in translation forward and back over portions of the nap surface to be cleaned,
- (c) a first roller supporting said frame for translation upon a nap surface,
- (d) a second roller journalled in said frame on a fixed axis and disposed adjacent said first roller and out of contact with the nap surface,
- (e) said second roller having a resiliently compressible deformable porous surface material thereon,
- (f) a third roller mounted in said frame for supporting the latter on a nap surface and spaced generally parallel to said first roller with said second roller generally between said first and third rollers,
- (g) means under the control of the operator for applying selected amounts of liquid cleaning fluid to said second roller,
- (h) said first and third rollers being mounted for free rotation thereof by the surface being treated during said translation, and
- (i) both said first roller and said third roller being mounted in said frame by movable bearings providing for limited predetermined movement of each roller toward and away from said second roller whereby said foaming action is produced by only said first roller engaging said second roller during one direction of translation and by only said third roller engaging said second roller during the opposite direction of translation.

4. In a manually operable device for applying and spreading a foam upon nap surfaces for cleaning the same:
- (a) a frame,

(b) a handle carried by said frame for manual manipulation of the latter in translation forward and back over portions of the nap surface to be cleaned.

(c) a first roller supporting said frame for translation upon the nap surface,

(d) a second roller journalled on a fixed axis in said frame adjacent said first roller and out of contact with the nap surface,

(e) means under the control of the operator for applying selected amounts of liquid cleaning fluid to said second roller,

(f) and means mounting said first roller in said frame for free rotation thereof by the surface being treated during said translation and for limited predetermined movement parallel to the direction of translation toward and away from said second roller depending upon the direction of translation at any given time,

(g) at least one of said rollers having a resiliently compressible deformable porous surface material thereon, and

(h) said mounting means providing for deformation of said compressible surface material and rotation of said second roller by said first roller when the latter moves toward the former to effect foaming of said cleaning fluid.

5. In a manually operable device for applying and spreading a foam upon nap surfaces for cleaning the same, and wherein a manually operable handle carries a frame having fixedly journalled therein a rotatable roller of porous yieldable material, and wherein means are provided for supplying a foamable cleaning liquid to said roller, the improvement comprising:

(a) means for supporting said frame and roller above and out of contact with the said nap surface, and

(b) means to drive said roller,

(c) said first means being mounted for movement parallel to the direction of translation and into deforming engagment with said roller upon translation of the device over said surface in a first direction, to thereby cause generation of foam beneath and ahead of the axle of said roller, and

(d) said first means also being mounted for movement parallel to the direction of translation and out of deforming engagement with said roller upon translation of the device in a second direction opposite from said first direction.



6. In a manually operable device for applying and spreading a foam upon nap surfaces for cleaning the same, and wherein a manually operable handle carries a frame having fixedly journalled therein a rotatable roller of porous yieldable material, and wherein means are provided for supplying a foamable cleaning liquid to said roller, the improvement comprising:

(a) means for supporting said frame and roller above and out of contact with the said nap surface,

(b) said supporting means being movable into deforming engagement with said roller upon translation of the device over said surface in a first direction, to thereby drive said roller and cause generation of foam beneath and ahead of the axle of said roller,

(c) said supporting means being movable out of engagement with said roller upon translation of the device in a second direction opposite from said first direction,

(d) said supporting means comprising:

(1) a pair of fore and aft rotatable hard-surfaced rollers mounted with their axes parallel to each other and to the axis of the said porous roller,

(2) and means mounting said fore and aft rollers for limited horizontal movement so that translation of the said device in either said first or second direction causes:

(A) the leading roller of said pair to move into deforming engagement with said porous roller to generate the said foam,

(B) and the trailing roller of said pair to move out of engagement with said porous roller,

(3) a change in direction of translation of the device causing a reversal of position and function of each of said pair of fore and aft rollers.

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