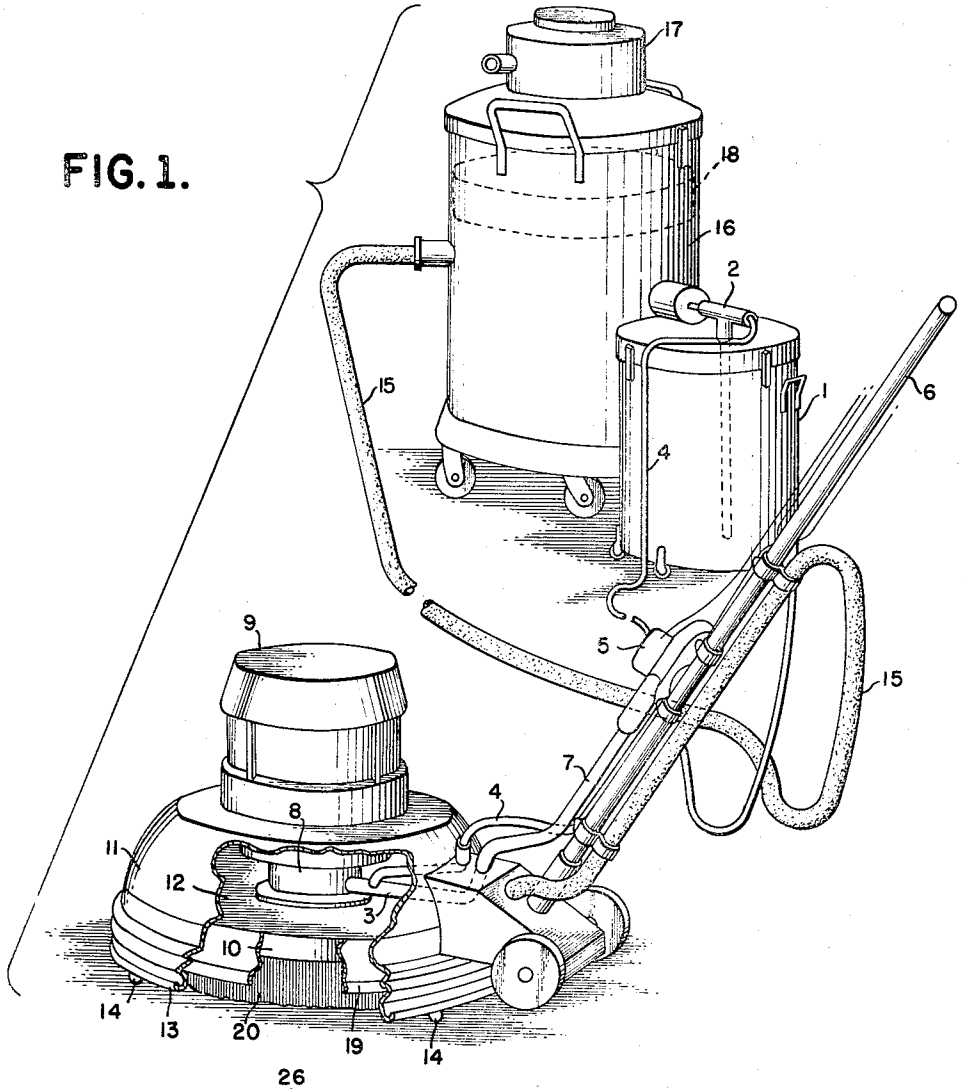
Feb. 9, 1960 M. E. BIXLER 2,923,956

CARPET OR RUG SCRUBBING SYSTEM

Filed Oct. 26, 1956 2 Sheets-Sheet 1

FIG. 1.



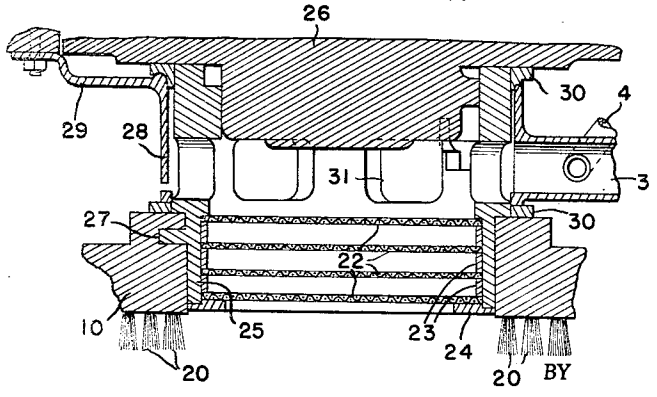


FIG. 4.

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Filed Oct. 26, 1956 2 Sheets-Sheet 2

FIG. 2.

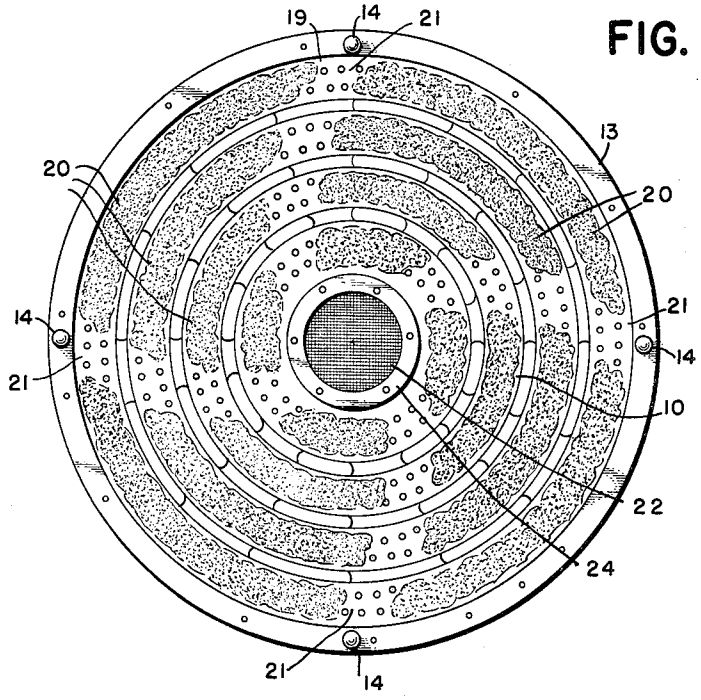
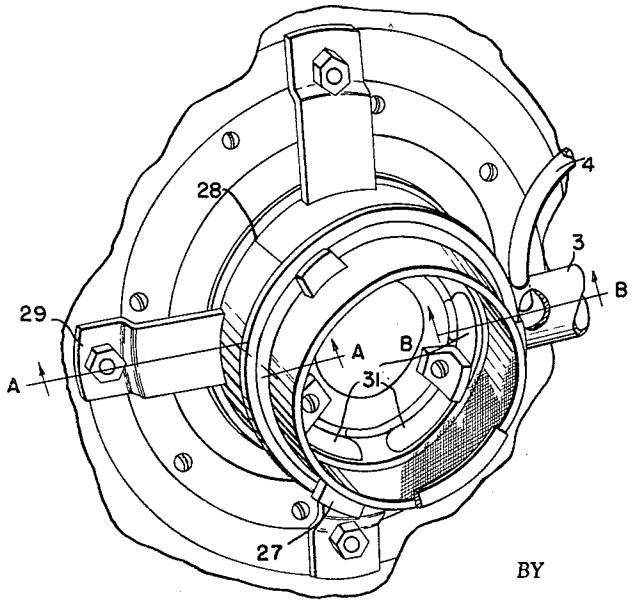


FIG. 3.



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CARPET OR RUG SCRUBBING SYSTEM

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Application October 26, 1956, Serial No. 618,654

1 Claim. (Cl. 15—50)

A non-exclusive, irrevocable, royalty-free license in the invention herein described, throughout the world for all purposes of the United States Government, with the power to grant sublicenses for such purposes, is hereby granted to the Government of the United States of America.

This invention relates to scrubbing machines and particularly to a complete scrubbing system, for on-location cleaning of floor coverings, such as pile type carpets and rugs.

The object of this invention is to provide an improved scrubbing system for cleaning floor coverings wherein an aqueous detergent solution is pre-generated into voluminous quantities of suds before coming into contact with the floor covering, said suds being used to scrub the rug or carpet by means of a brush having downwardly projecting bristles and being rotatable about a vertical axis, said voluminous suds being removed from the carpet immediately upon their exit from beneath the revolving brush, re-converted to the liquid form and collected in a suitable container.

The invention is best illustrated by referring to the accompanying drawings in which

Figure 1 is an overall view of the scrubbing system showing the rotary brush scrubber, detergent solution supply tank, and wet vacuum receiver.

Figure 2 is a bottom plan view of the scrubber.

Figure 3 is an underside view of the suds pre-generator assembly.

Figure 4 is a composite of sections taken through A—A and B—B of Figure 3.

Referring to the drawing, 1 is a detergent solution supply container having mounted thereon a positive displacement pump 2 driven by any prime mover (not shown). Detergent solution is conveyed to, and discharged into, the center of a tube, such as spray tube 3, by pump 2 through a flexible conduit, such as flexible hose 4, as will be described hereinafter, this prime mover, pump 2, and hose 4 being the means for discharging the detergent solution into the center of said spray tube 3. Air for generating spray is supplied by a blower, such as blower fan 5, mounted on scrubber handle 6 and having its discharge connected to spray tube 3 by hose 7. Detergent solution is generated into a fine spray in tube 3 and said fine spray is blown into suds-pregenerator section 8 mounted between prime mover 9 and horizontally rotatable brush 10, that is, a brush which is rotatable about a vertical axis. The suds-pregenerator section 8 contains suds producing means, to be later described, which are concentrically located within the horizontally rotatabtle brush 10, the discharge of said suds producing means being beneath the said brush. The brush 10, being slightly smaller than a housing 11, which is open at the bottom, is mounted therein, this housing 11 together with the brush back and side forming a vacuum suds removal chamber 12 for applying vacuum so as to immediately remove the suds upon their exit from beneath the brush. Housing 11 is flexibly extended to near contact

with the floor covering by bellows-type shroud 13 which is fastened to the bottom of, and surrounds the periphery of, the said housing, the shroud being made up of a plurality of zigzag folds that allow the shroud to move freely in a vertical cylindrical plane. The shroud is prevented from continuous contact with the carpet or rug, in order to avoid sealed suction, by a plurality of cylindrical appendages, such as buttons 14, on the bottom edge of shroud 13 extending downwardly in order to contact the surface being scrubbed.

Vacuum suds removal chamber 12 is remotely connected to a container for receiving the suds, such as wet vacuum receiver 16 by a flexible conduit, such as flexible hose 15. Soil laden suds, conveyed through hose 15 by a vacuum applied by a suction fan 17 mounted on wet vacuum receiver 16, are preferably re-converted to the liquid form by means of a "suds killing" barrier 18 having an extended surface, this barrier being mounted in wet vacuum receiver 16 and being interposed between the entrance aperture of hose 15 and suction fan 17.

A rigid vacuum barrier band 19 fastened to the periphery of brush 10, which has downwardly projecting bristles 20, and extending downward to cover the top half of the brush bristles 20 provides for vacuum removal of spent suds at the bottom half of the brush. Spiraled radial passageways, such as channels 21, formed by the bristles 20 of the brush, and being at least 5 times greater in width than the normal distance between bristles, extend radially from the center out to, and are terminated by, the outermost row of bristles. These passageways provide for movement of the suds toward the outside of the brush.

The suds producing means mentioned previously comprise a plurality of open mesh plates, such as four suds pre-generator screens 22, separated by a spacing means, such as spacer rings 23, to hold the plates apart in superposed relation. The plates are held in place by retainer ring 24 which is fastened to chamber forming means such as screen chamber 25. Screen chamber 25 is concentrically located partly within, and extends through, the said rotatable brush 10 and partly between said brush and a means for rotating said brush, indicated as gear box 26. The screen chamber 25 is rigidly fastened at its upper end to and rotates with gear box 26. The screen chamber 25 also has on its outer periphery a plurality of appendages, such as integral drive lugs 27, for engaging slots to drive brush 10. A stationary circular wall 28, surrounding the upper portion of screen chamber 25, is supported by extended appendages, such as extension arms 29, fastened to the housing, means being also provided for sealing the top and bottom edges of said wall, such as sealing rings 30. The spray tube 3 is connected to the said stationary circular wall 28 and detergent solution hose 4 extends through the side and into the center of tube 3.

Screen chamber 25 also provides a plurality of ports for admitting the air-detergent mixture, such as six radially disposed ports 31, which allow detergent spray to enter screen chamber 25 and thenceforth be generated into suds by striking screens 22.

In view of the foregoing, it will be seen that the present invention provides a carpet or rug scrubbing system that can be conveniently transported from place to place and used to scrub floor coverings such as pile type carpets and rugs without removing them from their normal surroundings. During such use the scrubbing system would be utilized in the following manner:

Enough detergent solution is mixed to adequately scrub the soiled rug and said solution is then placed in detergent solution supply container 1. An amount of defoaming agent is dispersed on "suds killing" barrier 18 in wet vacuum receiver 16. Then suction fan 17, on wet vacu-

um receiver 16, is started as is pump 2, blower fan 5 and brush 10. Tilt scrubber slightly, when suds appear, move scrubber over floor covering using a spiral motion. Cleansing action is attained by the detergent suds which are pre-generated before coming into contact with the floor covering. As the suds issue from the center feed suds pre-generator they are worked into the nap of the carpet by the revolving brush. The suds flow channels in the brush allow the soil laden suds to gradually move to the periphery of the rotating brush and hence be sucked up and conveyed to the wet vacuum receiver.

I claim:

A scrubbing machine for on-location cleaning of a pile-type floor covering comprising a housing open at the bottom, a brush mounted in said housing and extending near the bottom thereof, said brush having downwardly projecting bristles and being rotatable about a vertical axis, means for rotating said brush, a blower, a tube connected to the discharge of the blower, means for discharging a detergent solution into the center of said tube, chamber forming means, said tube being attached to a stationary wall surrounding said chamber forming means, said stationary wall being supported by extended appendages fastened to the housing, means for sealing the top and bottom edges of said wall, said chamber forming means being concentrically located partly within

and extending through the rotatable brush and partly between said brush and said means for rotating said brush, said chamber forming means having on its lower outer periphery a plurality of appendages for engaging and driving said brush, said chamber forming means being rigidly fastened at its upper end to and rotating with the said means for rotating the brush, said chamber forming means having a plurality of ports for admitting the air-detergent solution mixture, and said chamber forming means having fastened therein a plurality of open mesh plates separated by a spacing means so as to hold said plates apart in superposed relation.

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