United States Patent

Hughes et al.

[15] **3,686,707**

[45] **Aug. 29, 1972**

[54] **FOAM EXTRACTOR FOR ROTARY SCRUBBER**

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[73] Assignee: **Chemical Specialties Manufacturing Corp.**

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[52] **U.S. Cl.** ..... **15/385,** 15/50 R, 15/320
[51] **Int. Cl.** **A47l 7/02**
[58] **Field of Search** ..... 15/50 R, 302, 320, 321, 322, 15/385, 328

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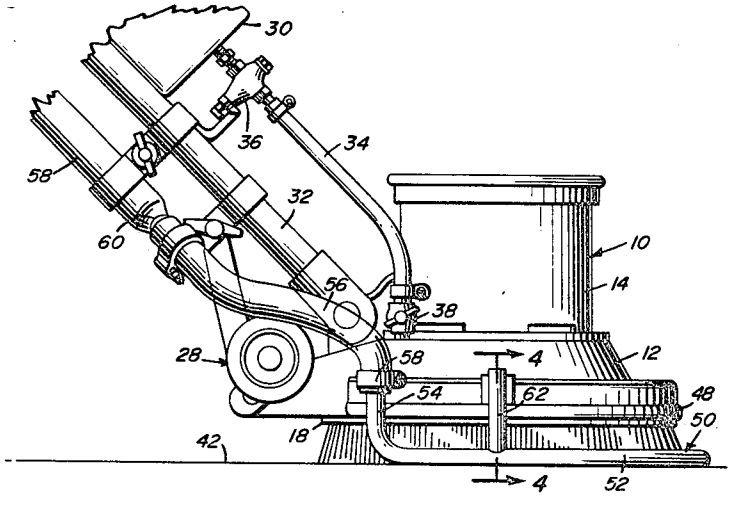
[57] **ABSTRACT**

An attachment for a rotary scrubber of the type including a body from which a downwardly facing rotary scrubbing member is journalled for rotation about an upstanding axis and also including a rearwardly projecting handle for control of the scrubber by the operator thereof. The attachment includes a tubular frame member supported from the body and extending about and closely embracing a major portion of the lower periphery of the scrubbing member. The frame includes openings in its undersurface through which air and foam may be drawn and structure is provided for coupling the inlet end of a vacuum line to the frame member. Further, and probably most important, the frame member is supported from opposite sides of the scrubber body for oscillation about a horizontal transverse axis and with the structure defining the spaced portions of the axis of oscillation of the frame member at the opposite sides of the body being supported from the latter for vertical shifting between upper and lower limit positions and biased toward their lower limit positions. In this manner, the tubular air and foam induction frame member is supported from the body of the rotary scrubber in a "floating" manner specifically designed to enable the rotary scrubber to be rocked by up and down movement on the rearwardly projecting handle thereof for control of the rotary scrubber over a surface being cleaned while the tubular frame member has its lower surfaces maintained in full contact with the surface being cleaned.

13 Claims, 7 Drawing Figures



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SHEET 1 OF 2

Fig . 1

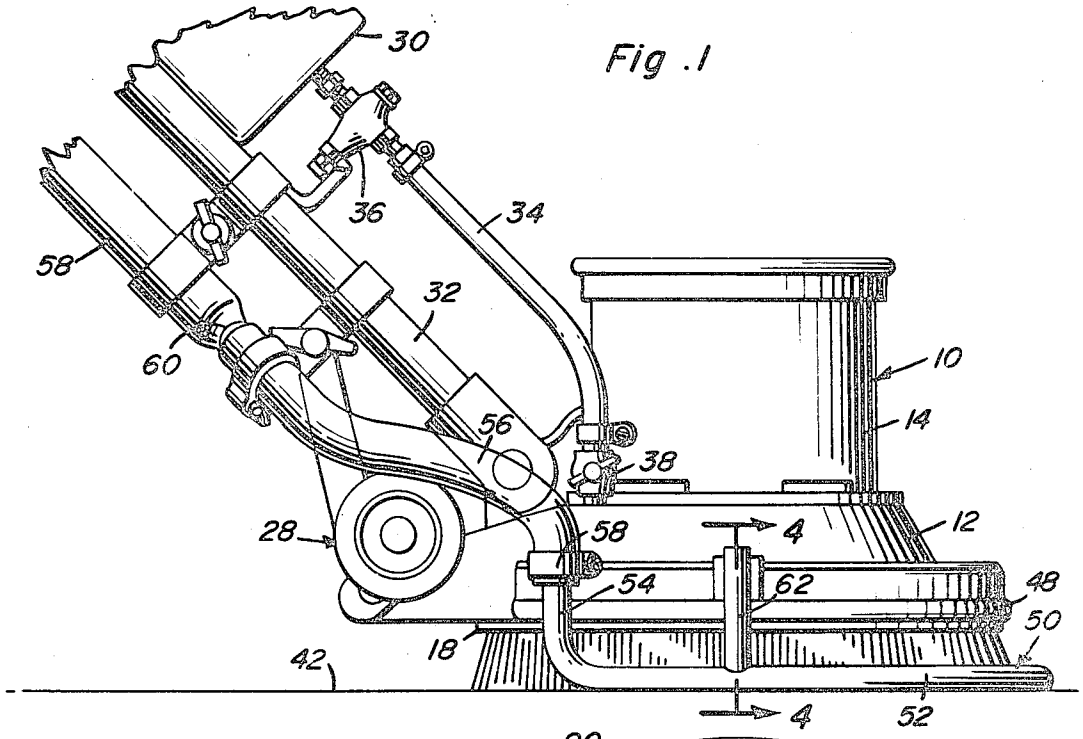

Fig . 2

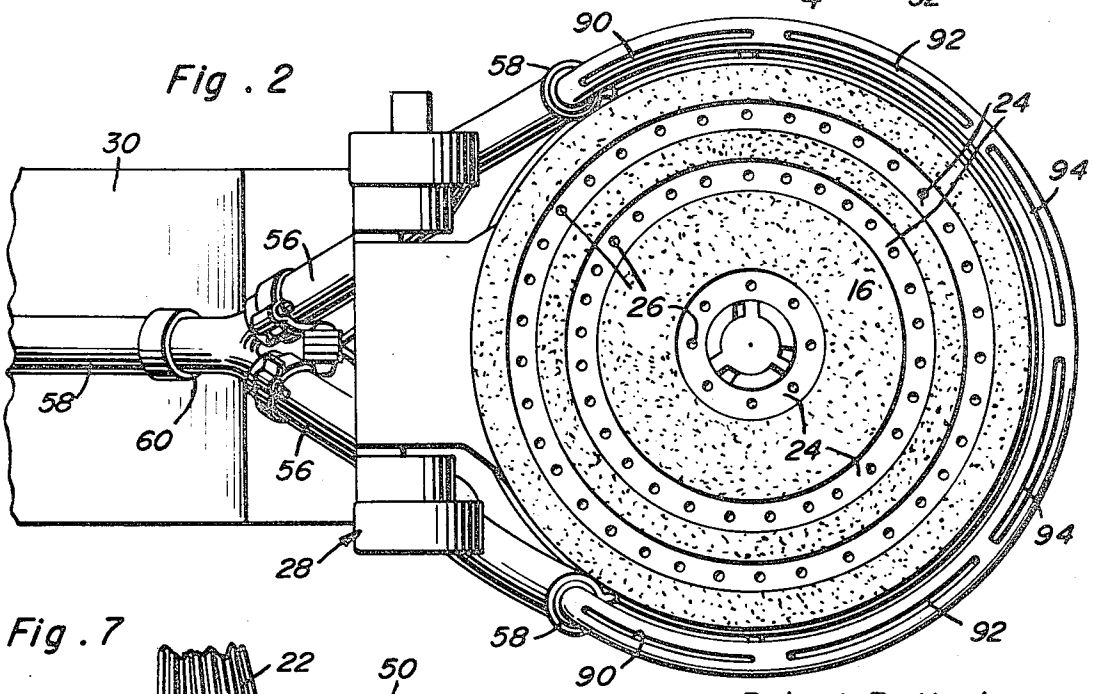

Fig . 7

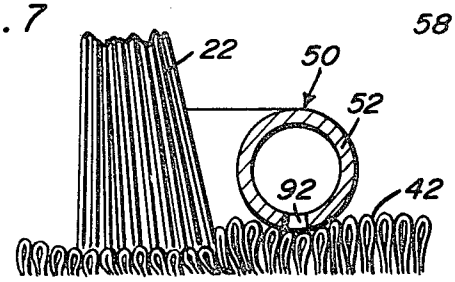

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Fig . 3

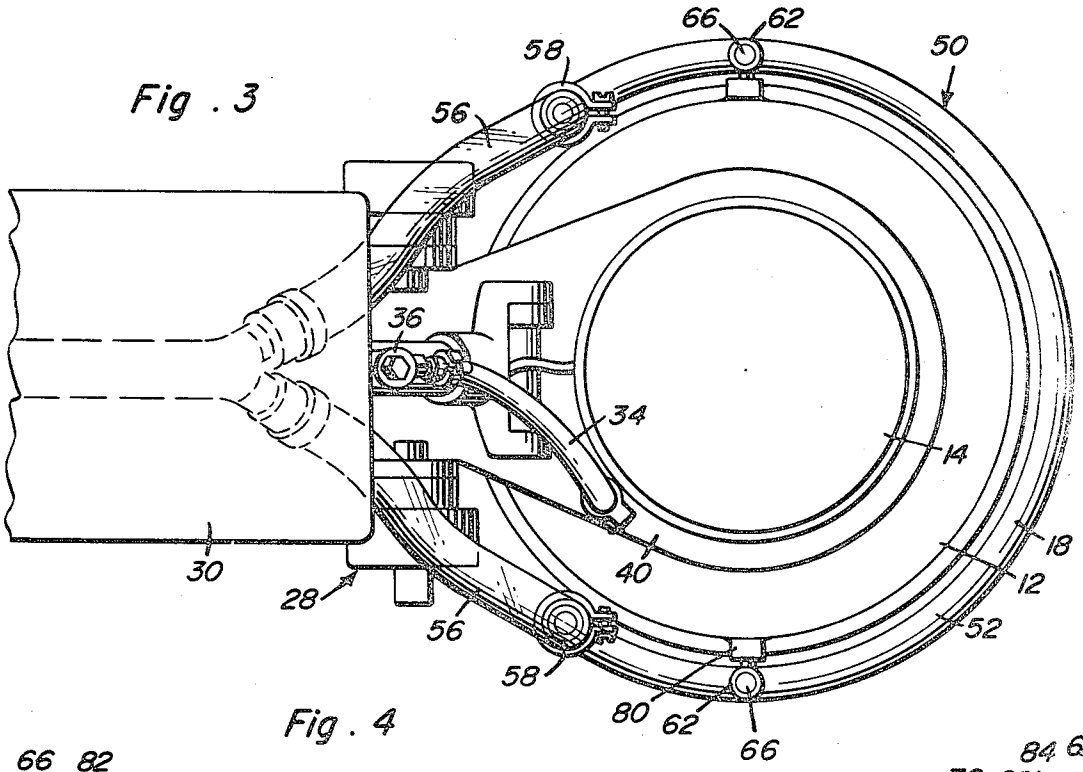


Fig . 4

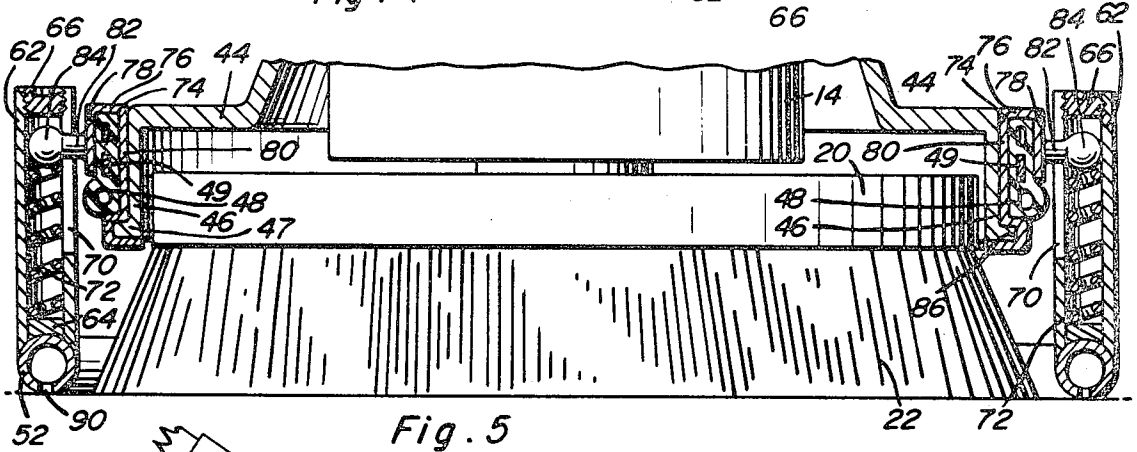


Fig . 5

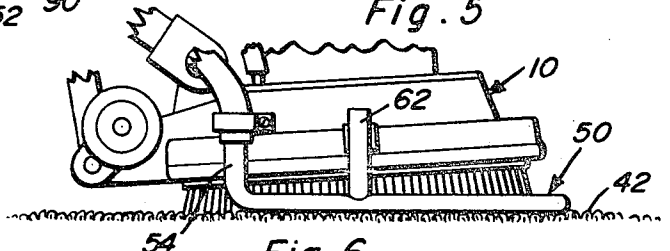
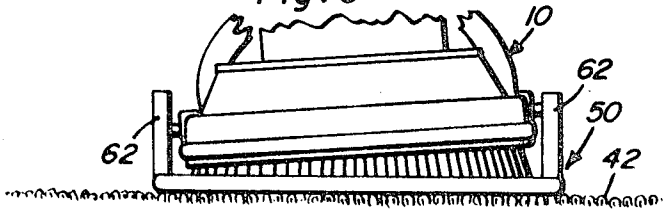


Fig. 6



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FOAM EXTRACTOR FOR ROTARY SCRUBBER

The scrubber attachment of the instant invention has been specifically designed for use on rotary scrubbers being utilized to clean rugs and carpets, although the attachment may also be utilized to advantage on rotary scrubbers being utilized to clean other surfaces. However, inasmuch as the attachment is specifically designed for use in cleaning rugs and carpets, emphasis is placed on those structural and operational features of the attachment relating to rug and carpet cleaning.

In the past rugs and carpets have for the most part been cleaned by being sent to rug shampooing firms wherein the rugs and carpets are actually shampooed with a liquid solution, rinsed and then hung to dry. However, with the increased utilization of wall-to-wall carpeting which may not be readily removed, sent out for shampooing and then reinstalled, the rug cleaning industry has developed several methods of cleaning rugs and carpets in place on flooring surfaces.

One of these methods is commonly referred to as "-steam cleaning" although live steam most certainly cannot be utilized to clean carpet fibers and especially carpet fibers constructed of synthetic materials, inasmuch as these synthetic materials will not withstand the temperature of live steam. Nevertheless, a hot cleaning solution is applied to the carpet and immediately thereafter an attempt is made to pick up as great a portion of the hot cleaning solution as is possible. However, attempts to date to construct an apparatus which will be efficient in picking up hot rug cleaning solutions immediately after they are applied to a carpet or rug being cleaned have not met with complete success.

Another method of cleaning rugs and carpets while they are disposed on the floor involves the utilization of a cleaning solution having a "flash sudsing"action. This cleaning solution is applied by rotary scrubbing machines having liquid cleaning solution dispensing means associated therewith. As a matter of practice, rug cleaning establishments utilizing "flash sudsing" cleaning solutions dispatch several workmen to the area in which rugs or carpets are to be cleaned. One workman is equipped with a liquid cleaning solution dispensing rotary scrubber of conventional design and another workmen will be provided with a wet vacuum. As the workman equipped with the rotary scrubber progresses over the carpet being cleaned with his scrubbing machine, the high sudsing cleaning solution is dispensed and immediately whipped into high suds by the brush member of the scrubbing machine and as soon as the scrubbing machine moves to another area, the workman provided with the wet vacuum utilizes the latter to pick up as much of the suds left in the area of the rug being cleaned by the liquid cleaning solution dispensing rotary scrubber.

However, the high sudsing liquid cleaning solution is operative to loosen and suspend the particles of dirt in the rug acted upon by the solution as the liquid cleaning solution is whipped into suds and the minute particles of dirt and soil removed from the rug or carpet being cleaned tend to collect in a lesser number of larger agglomerated masses of dirt particles. If these agglomerated masses of dirt particles could be immediately sucked up by a wet vacuum together with the foam in which they are suspended, reasonably efficient

cleaning of the carpet can be accomplished. However, the vacuum pick up of the cleaning solution foam and agglomerated dirt masses suspended therein must be accomplished immediately after the cleaning solution is whipped into foam by the rotary scrubbing member and this is not possible if the workman handling the wet vacuum pick up must wait until the workman operating the cleaning solution dispensing scrubber moves to a new area of the carpet being cleaned. The agglomerated masses of dirt particles tend to quickly settle downwardly through the foam and back into the carpet (the cleaning solution being a highly efficient wetting agent) and thus most of the agglomerated dirt particles are left in the carpet and at least partially reembedded therein before a workman following the rotary scrubber with a vacuum pick up can pick up the foamed cleaning solution. It is for this reason that substantially all rug cleaning companies which operate to clean rugs in a person's home instruct that the "-cleaned" rugs be allowed to dry thoroughly before being walked upon and that they further be fully vacuumed after they dry and before they are walked upon. This dry vacuuming does of course pick up some of the agglomerated dirt particle masses. However, the actual removal of the largest part of the dirt particles is accomplished during the dry vacuuming process and most household vacuum cleaners, and particularly those not provided with rug vibrating structures, are not powerful enough to pick up an appreciable portion of the dried agglomerated dirt particles. The end result of a large portion of the agglomerated dirt particles remaining in the rug results in these particles eventually being broken up into finer dirt particles by persons walking upon the rug and the rug appears to be soiled quite quickly.

Accordingly, it is the main object of this invention to provide a foam extracting and pick up attachment for a rotary scrubber equipped with rug cleaning solution dispensing means and constructed in a manner whereby the foam generated by the rotary scrubbing member may be immediately picked up as the scrubber is moved back and forth across the rug being cleaned. Although some development has been heretofore made in this area and foam pick up attachments such as those disclosed in U.S. Pat. Nos. 2,495,686, 2,633,595 and 2,999,258 are presently commercially available, these attachments do not provide means for immediately picking up the cleaning solution foam and agglomerated dirt masses suspended therein in an efficient manner. Some of these attachments require that the foam to be picked up is wiped across the upper surface of the rug to a pick up point before being subject to sufficient vacuum to be extracted from the rug and no provision has been made to compensate for the rocking or "heeling" of the scrubber during operation of the latter in order to cause the scrubber to move back and forth across the rug being cleaned with the result that appreciable amounts of the vacuum force at hand is lost.

It is therefore a second object of this invention to provide an attachment in accordance with the immediately preceding object and which will be operative to immediately pick up the cleaning solution foam and dirt agglomerated masses suspended therein immediately after the cleaning solution is whipped into

foam and as the rotary scrubber moves over the rug surface being cleaned.

Yet another object of this invention is to provide an attachment in accordance with the preceding objects and constructed in a manner whereby substantially all of the vacuum force available will be applied directly to the carpet and thus rendered efficient in the foam pick up operation.

Another object of this invention is to provide an attachment with mounting means therefor that may be readily attached to various scrubbing machines of different manufacturers and which therefore can be manufactured in several different sizes and readily mountable on these standard sizes of rotary scrubbers, even though several manufacturers may each produce a scrubber of these various sizes.

Yet another object of this invention is to provide a foam extractor for rotary scrubbers utilizing a mounting structure which may be in part incorporated into the manufacture of rotary scrubbers so as to enable the attachment of the instant invention to be even more easily attached thereto and removed therefrom, when desired.

A final object of this invention to be specifically enumerated herein is to provide a foam extractor for rotary scrubbers which will conform to conventional forms of manufacture, be of simple construction and substantially automatic in operation so as to provide a device that will be economically feasible, long lasting and relatively trouble free.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout and in which:

FIG. 1 is a fragmentary side elevational view of a conventional form of rotary scrubber with the foam extractor attachment of the instant invention supported therefrom;

FIG. 2 is a fragmentary bottom plan view of the assemblage illustrated in FIG. 1;

FIG. 3 is a top plan view of the assemblage illustrated in FIGS. 1 and 2;

FIG. 4 is an enlarged fragmentary transverse vertical sectional view taken substantially upon the plane indicated by the section line 4—4 of FIG. 1;

FIGS. 5 and 6 are fragmentary elevational views of the assemblage illustrated in FIGS. 1 through 4 as seen from the side and front illustrating the manner in which the rotary scrubber may be tilted independently of the foam extracting vacuum pick up attachment; and

FIG. 7 is a fragmentary enlarged vertical sectional view illustrating the operative association of the bristles of the rotary scrubbing member and the vacuum pick up tube of the attachment in operative association with a section of carpet being cleaned.

Referring now more specifically to the drawings the numeral 10 generally designates a conventional form of rotary scrubber including a body 12 from which an electric motor 14 is supported. The electric motor 14 includes a rotary output shaft 16, see FIG. 2, upon which a rotary brush 18 is mounted for rotation therewith. The brush 18 is of conventional design and includes a disk-shaped body 20 removably attached to the rotary output shaft 16 and from which a plurality of brush bristles 22 depend. Further, the rotary brush 18 includes concentric corrugations in its body 20 through whose concentric lower portions 24 circumferentially spaced discharge openings 26 are formed.

The rotary scrubber includes a retractable wheel assembly referred to in general by the reference numeral 28 for transporting the scrubber 10 when it is not being utilized to scrub a carpet and a cleaning liquid reservoir 30 is supported from the rearwardly and upwardly projecting handle 32 of the scrubber 10. The lower end of the handle 32 is pivotally supported from the body 12 of the scrubber 10 for adjustable positioning about a horizontal transverse axis in order to adapt the machine for use by workmen of different heights and the cleaning liquid reservoir 30 includes a gravity discharge line 34 provided with a remotely operable control valve 36 and an adjacent flow rate control valve 38. The discharge end of the discharge line 34 opens downwardly through a top wall portion 40 of the body 12 and is operable to discharge cleaning liquid from the reservoir 30 down onto the upper surface of the body 20 of the brush 18 whereupon the cleaning liquid will be dispensed downwardly through the openings 26 and onto the carpet 42 upon which the rotary scrubber 10 rests for whipping into foam by the bristles 22 of the brush 18.

The body 12 includes an outer peripheral annular flange portion 44 which terminates outwardly in a downwardly directed and generally cylindrical flange portion 46 including a lower outwardly projecting peripheral bead 47 and the flange portion 46 closely embraces but is spaced radially outwardly from the outer periphery of the body 20 of the brush 18. In addition, a resilient bumper 48 is secured about the flange portion 46 and includes an inner tension band 49 (see FIG. 4).

The foregoing comprises a description of a conventional rotary scrubber.

The foam extractor of the instant invention comprises an attachment for the rotary scrubber 10 and is generally referred to by the reference numeral 50. The attachment 50 includes a tubular frame member 52 which is generally circular in plan shape although the tubular member 52 does not define a complete circle. Instead, the tubular member extends through an arc of approximately 270° and closely embraces the lower end portions of the outermost bruch bristles 22. The opposite ends of the tubular member 52 are turned upwardly as at 54 and have the inlet ends of a pair of flexible and transparent vacuum tubes 56 telescoped thereover and secured thereon by means of removable clamp assemblies 58. The outlet ends of the vacuum tubes 56 are coupled to a single larger diameter and transparent vacuum tube 58 supported from and extending upwardly along the handle 32 by means of a Y-fitting 60. The discharge end of the large diameter vacuum tube 58 is in turn operatively coupled to the inlet end of the vacuum line for a wet vacuum pick up machine (not shown).

A pair of upstanding support tubes 62 have their lower ends concavely radiused and secured to opposite side portions of the tubular member 52 lying in an upstanding transverse plane passing through the axis of

rotation of the rotary output or drive shaft 16 of the motor 10. The lower ends of the support tubes 62 are closed by means of plugs 64 secured therein and each of the tubes 62 includes an upper end plug 66 threadedly secured in place. Also, each of the tubes 62 includes a longitudinal slot 70 and the slots 70 open radially outwardly of the tubes 62 toward each other.

A compression spring 72 is disposed in each tube 62 and has its lower end seated on the corresponding plug 64. Further, each of the opposite side portions of the body 12 has an inverted J-shaped mounting bracket 74 including a horizontal flange 76 and short and long vertical flanges 78 and 80, respectively, secured thereto. Each of the flanges 80 is secured under the bumper 48 and to the flange portion 46 with the bumper 48 compressed between the flanges 78 and 80. Each of the vertical flanges 78 includes a horizontally outwardly projecting shank 82 projecting inwardly through and slidably received in the corresponding slot 70 above the spring 72 and the free end of each shank 82 includes a spherical enlargement 84 rotatably and slidably disposed in the corresponding tube 62 and the upper ends of the springs 72 push upward on the enlargements 84. Thus, the support tubes 62 are supported from opposite side portions of the body 12 for vertical shifting relative thereto and for oscillation about a horizontal transverse axis coinciding with the center lines of the shanks 82. Also, the lower ends of the flanges 80 are contoured to define inwardly opening channels 86 in which the adjacent portions of the bead 47 are snugly received.

The tube member 52 includes a pair of downwardly opening circumferentially extending narrow slots 90 in its opposite end portions adjacent the upstanding end portions 54, a second pair of slightly wider slots 92 disposed immediately forward of the vertical transverse plane containing the shanks 82 and a third pair of still wider slots 94 formed therein at the front portion of the tube member 52. The slots 90, 92 and 94 each open downwardly through the lower peripheral portion of the tube member 52 and the spacing between adjacent slots 90, 92 and 94 is maintained at a minimum. However, by providing wider slots 94 in the portions of the tube member 52 farthest from the vacuum tubes 56 and progressively narrower slots in those portions of the tube member 52 closer to the vacuum tubes 56, the vacuum force available throughout the peripheral extent of the slotted portions of the vacuum tube 52 is equalized.

Existing rotary scrubbers such as the scrubber 10 may be modified to accept the foam extractor 50 merely by the attachment of the mounting brackets 74 thereon. Then, when it is desired to mount the tubular member 52 on the rotary scrubber, the plugs 66 of the tubes 62 are removed and the enlargements are pushed downward into the upper ends of the tubes 62 with the shanks 82 received through the slots 70. The, after the plugs 66 have been replaced, the various vacuum tubes 56 and 58 may be mounted on the scrubber 10 and the inlet ends of the vacuum tubes 56 may be coupled to the upstanding ends 54 of the vacuum tubes 56 may be coupled to the upstanding ends 54 of the tubular member 52. Thereafter, the scrubber 10 may be operated in the conventional manner so as to cause the heeling actions thereof illustrated in FIG. 6 of the drawings in order to move the scrubber 10 over the carpet the valve 36 is actuated to dispense cleaning solution down through the delivery line 34 and through the openings 26 whereupon the cleaning solution will be spun into contact with the bristles 22 and deposited on the rug 42 and immediately whipped into a foam in which dirt particles from the carpet 42 will be agglomerated and suspended.

However, as the cleaning solution is whipped into a foam and the dirt particles from the carpet or rug 42 are agglomerated and suspended in the foam, the tubular member 52 is being moved back and forth across the carpet 42 with the scrubber 10 and the slotted lower peripheral portions of the tubular member 52 are thus caused to wipe up the surface of the carpet 42 with the result that the whipped foam and agglomerated dirt particles suspended therein are immediately sucked into the tube 52 by the vacuuming action of the wet vacuum pick up assembly (not shown) to which the vacuum tube 58 is connected. Accordingly, almost immediately after the cleaning solution is whipped into foam or suds and the dirt particles removed from the carpet 42 are agglomerated and suspended in the foam, the foam is vacuumed from the carpet.

In actual practice, the foam extractor of the instant invention has been found to be effective in reclaiming at least one-third of the total amount of liquid dispensed by the scrubber 10, whereas previous rug cleaning methods utilizing two workmen with one workman operating a scrubber and the other workman operating a vacuum pick up have been found to be effective in reclaiming a much smaller percentage of the total amount of liquid cleaning solution dispensed. Accordingly, with the understanding that an appreciable portion of the liquid cleaning solution dispensed will pass downwardly deep into the carpet being cleaned due to the "wetting agent" properties of the cleaning solution and thus be disposed below the scrubbing action of the bristles 22 acting upon the fiber portions of the carpet 42 being cleaned, substantially all of the cleaning solution dispensed that is turned into foam by the scrubbing action of the brush bristles 22 and thus substantially all of the agglomerated dirt particles suspended in the foam is removed by the intimate vacuuming action of the foam extractor 50 on the carpet 42 and thus there is substantially no need for the carpet 42 to be vacuumed after it has dried, as far as the cleaning operation on the carpet 42 is concerned.

The springs 72, enlargements 84 and shanks 82 serve to support the tubular member 52 from the body 12 of the scrubber 10 with a "floating action" and therefore the tubular member 52 is maintained in intimate contact with the upper fiber portions of the carpet 42 throughout operation of the scrubber 10. Further, by placing the shanks 82 along a transverse diameter of the scrubber 10 passing through the axis of rotation of the output shaft 16, the greater tilting action of the body 12 of the scrubber 10 by the operator is easily compensated for and the lesser heeling of the body 12 from side-to-side during orbital movement of the scrubber 10 over the carpet 42 being cleaned is compensated for by the vertical shifting of the shanks 82 in the slots 70.

With the instant two point "floating suspension" of the tubular member 52, the latter is maintained in inti-

mate contact with the upper portions of the carpet fibers at all times during operation of the scrubber **10**. It has been found that the instant two point suspension system operates in a superior manner over three point or four point suspension systems, inasmuch as three and four point suspension systems are not capable of maintaining the tubular member **52** in full contact with the upper portions of the rug fibers during heeling movement of the scrubber **10**.

Although the foam extractor has been illustrated and described hereinbefore in operative association with a rug scrubbing machine, it can be utilized on floor scrubbers. Further, the extractor may also be utilized on smaller scale rotary scrubbing devices designed primarily for cleaning upholstery.

The disposition of the axis of oscillation of the tubular member **52** as determined by the bearing pins **88** is important in that the orbital path through which the scrubber **10** is normally operated when cleaning a carpet is accomplished by the operator of the scrubber **10** alternately pushing downwardly upon and lifting upwardly on the handle **32**. Thus, the maximum heeling of the scrubber **10** is in a fore and aft direction and not in a side-to-side direction and therefore the instant two point floating suspension system has been arranged on the scrubber **10** in a manner to compensate for greater fore and aft heeling of the scrubber **10**.

The tubular member **52** may also be constructed of transparent material and in this manner, the flow of foam through the tubular member **52**, the tubes **56** and the tube **58** may be viewed so as to determine when substantially all of the foam being whipped on the rug fibers by the brush **18** has been drawn into the vacuum passages of the foam extractor. Also, the plurality of slots **90**, **92** and **94** may take the form of a single continuous slot which tapers in width toward the rear ends of the tubular member or a pair of opposite slide slots which also taper toward the rear ends of the tubular member **52**. In any event, it has been found that vacuum openings such as applicant's closely spaced slots **90**, **92** and **94** perform a much more efficient foam extraction operation on the rug or carpet being cleaned than could be accomplished by forming a plurality of side-by-side apertures in the undersurface portions of the tubular members **52**.

The positions of the pins **88** in the slot **70** are representative of a rotary brush whose bristles are not worn and are of substantially full length. When the bristles of the rotary brush wear down and become shorter, the pins **88** will be disposed lower in the slot **70** as the tubular member **52** is elevated relative to the body **12** of the rotary scrubber **10**.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In combination, a rotary scrubber including a body having opposite side and front and rear marginal portions, horizontal downwardly facing rotary scrubbing means underlying the body and journalled therefrom for rotation in a generally horizontal plane, a handle supported from said body and including an elevated portion disposed to the rear of said body, a generally horizontal tubular peripheral member closely embracing and extending peripherally about the horizontal area in which said scrubbing means is disposed, said tubular member and said body including coacting means supporting said tubular member from said body for oscillation about a horizontal transverse axis extending between said opposite side portions of said body and for limited vertical displacement of the opposite ends of said horizontal transverse axis relative to said body, said tubular member including connecting means operative to connect the inlet end of a vacuum conduit thereto and the lower wall portions of said tubular member having inlet opening means formed therethrough with portions thereof spaced along said tubular member for the ingress of cleaning solution foam and dirt particles suspended in the foam from a surface being scrubbed by and over which said scrubber is being operated.

2. The combination of claim 1 wherein at least the portions of said tubular member in which said inlet opening means is formed is downwardly transversely convexed.

3. The combination of claim 1 wherein said opening means includes elongated slot means extending along said lower wall portions.

4. The combination of claim 3 wherein said slot means includes a plurality of longitudinally spaced slots spaced along said tubular member different distances from said connecting means, said slots increasing in width as the spacing thereof from said connecting means increases.

5. The combination of claim 1 wherein said tubular member includes spaced opposite ends disposed rearward of said horizontal transverse axis.

6. The combination of claim 5 wherein said opposite ends are open and comprise a part of said connecting means.

7. In combination, a rotary scrubber including a body having opposite side and front and rear marginal portions, horizontal downwardly facing rotary scrubbing means underlying the body and journalled therefrom for rotation in a generally horizontal plane, a handle supported from said body and including an elevator portion disposed to the rear of said body, a frame-like generally horizontal tubular peripheral member closely embracing and extending at least partially peripherally about the horizontal area in which said scrubbing means is disposed, said peripheral member including portions thereof extending in front-to-rear directions along the opposite side portions of said area, said tubular member and said body including coacting means supporting said tubular member from said body for limited vertical shifting and free inclination in any direction relative to said body, said coacting means also including means operative to yieldingly urge said tubular member toward the lower limit position, said tubular member including connecting means operative to connect the inlet of a vacuum conduit thereto and the lower wall portions of said tubular member having inlet slot means formed therethrough extending along said tubular member, said slot means increasing in width as the distance from said connecting means increases.

8. The combination of claim 1 wherein said coacting means includes outwardly projecting aligned shanks carried by said opposite side marginal portions of said body, a pair of upright guides carried by said tubular member with which said shanks are slidingly engaged for movement vertically therealong between upper and lower limit positions and relative to which said shanks are oscillatable, and means yieldingly biasing said shanks upwardly relative to said guides.

9. The combination of claim 8 wherein said guides comprise upright tubes having upstanding slots formed through their adjacent wall portions, said shanks projecting through and being slidable along and oscillatable in said slots, a spherical enlargement on the outer end of each shank slidably and rotatably received in said tubes, said means biasing said shanks upwardly including compression springs bottomed in said tubes and thrusting upwardly on said enlargements.

10. The combination of claim 9 wherein said compression springs are open at their upper ends and said enlargements are seated downwardly into the upper ends of said springs.

11. The combination of claim 1 wherein said coacting means includes outwardly projecting aligned shanks carried by said opposite side marginal portion of said body, a pair of upright guides carried by said tubular member with which said shanks are slidingly engaged for movement vertically therealong between upper and lower limit positions and relative to which said shanks are oscillatable, and means yieldingly biasing said shanks upwardly relative to said guides, said shanks being carried by brackets removably secured to said body.

12. The combination of claim 11 wherein each of said opposite side marginal portions of said body includes a horizontal peripheral upper surface terminating outwardly in a depending upright side surface, said brackets including upstanding flange portions closely overlying said side surface, said shanks projecting outwardly from said upstanding flange portions.

13. In combination, a rotary scrubber including a body having opposite side and front and rear marginal portions, horizontal downwardly facing rotary scrubbing means underlying the body and journalled therefrom for rotation in a generally horizontal plane, a handle supported from said body and including an elevated portion disposed outwardly of one marginal portion of said body, an open frame-like attachment including an elongated generally horizontal tubular member closely embracing and extending at least partially about the horizontal area in which said scrubbing means is disposed, said attachment including tubular portions thereof extending in front-to-rear directions along the opposite side portions of said area, said tubular member and said body including coacting means supporting said tubular member from said body for limited vertical shifting and free inclination in any direction relative to said body, said coacting means also including means operative to yieldingly urge said tubular member toward a lower limit position relative to said body, said tubular member including connecting means operative to connected the inlet end of a vacuum conduit thereto and the lower wall portions of said tubular member having at least one inlet opening formed therethrough.

* * * * *