June 22, 1965 H. G. TUTHILL, JR 3,189,930

SURFACE CLEANING APPARATUS

Filed June 16, 1964 4 Sheets-Sheet 1

Fig. 1

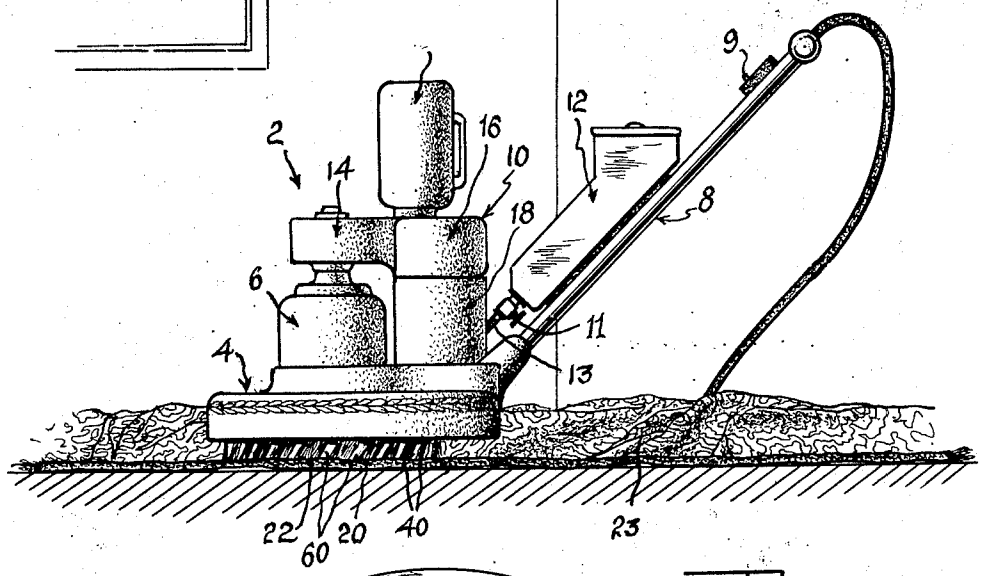
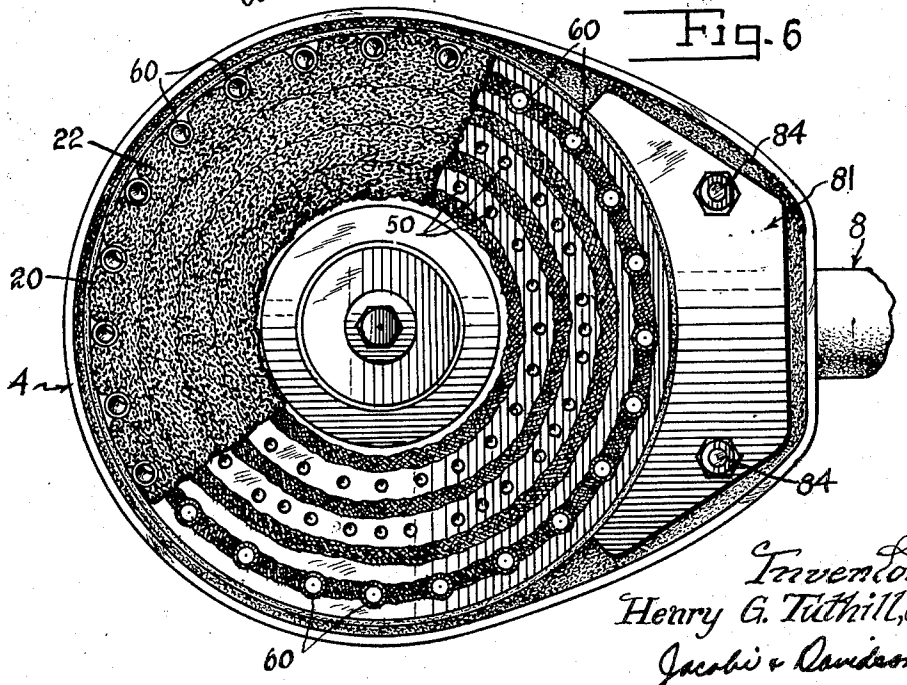


Fig. 6



Inventor:
Henry G. Tuthill, Jr.
Jacobi & Davidson
Attorneys.

BY

June 22, 1965 H. G. TUTHILL, JR 3,189,930

SURFACE CLEANING APPARATUS

Filed June 16, 1964 4 Sheets-Sheet 2

Fig. 3

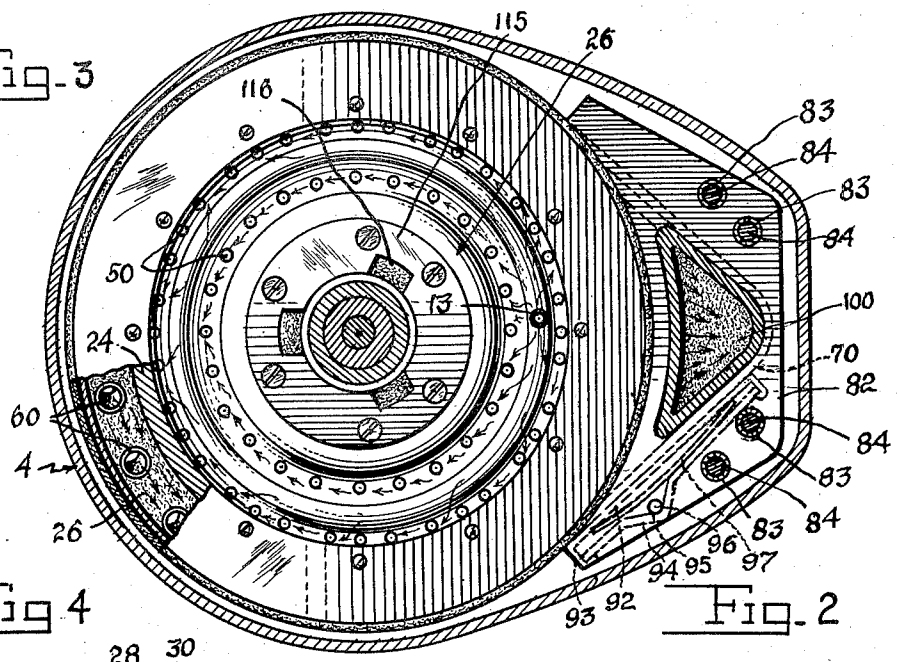


Fig 4

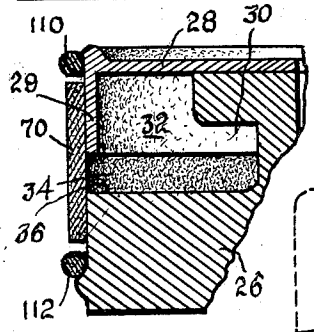


Fig. 2

Inventor:
Henry G. Tuthill, Jr.
BY Jacobi & Davidson
Attorneys.

June 22, 1965 H. G. TUTHILL, JR 3,189,930

SURFACE CLEANING APPARATUS

Filed June 16, 1964 4 Sheets-Sheet 3

Fig. 5

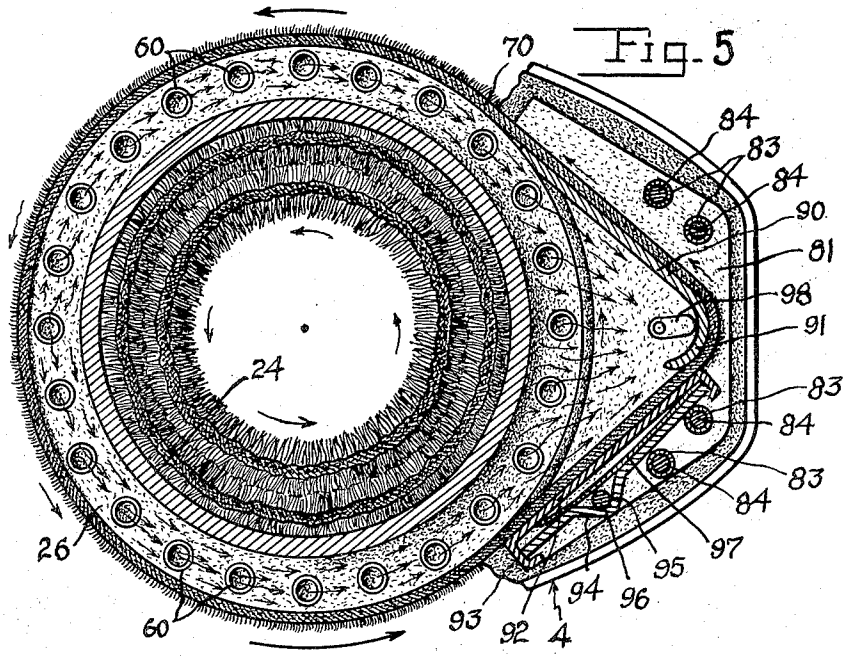
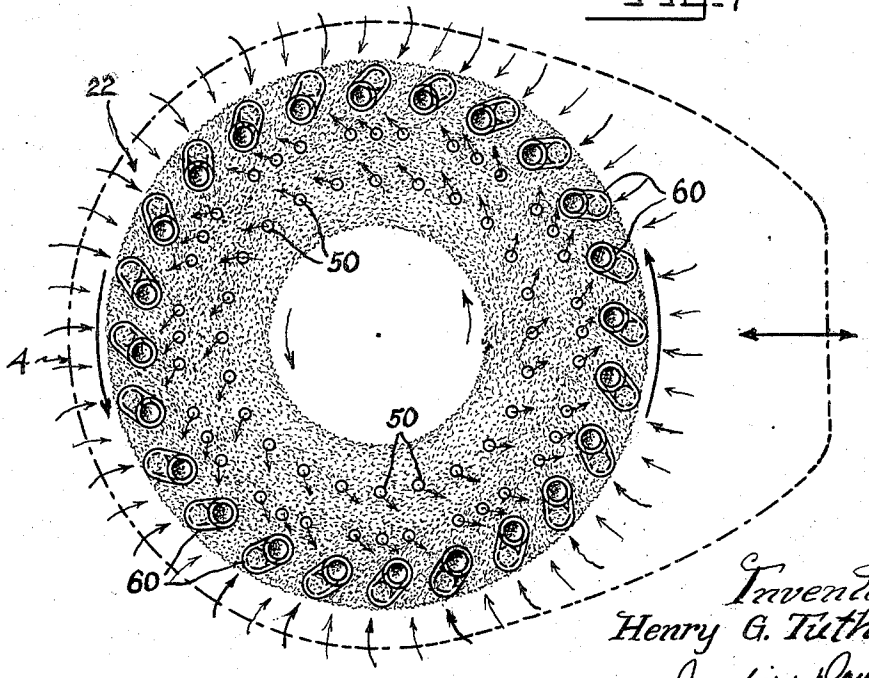


Fig. 7



Inventor:
Henry G. Tuthill, Jr.
BY Jacobi & Davidson
Attorneys.

June 22, 1965 H. G. TUTHILL, JR 3,189,930

SURFACE CLEANING APPARATUS

Filed June 16, 1964 4 Sheets-Sheet 4

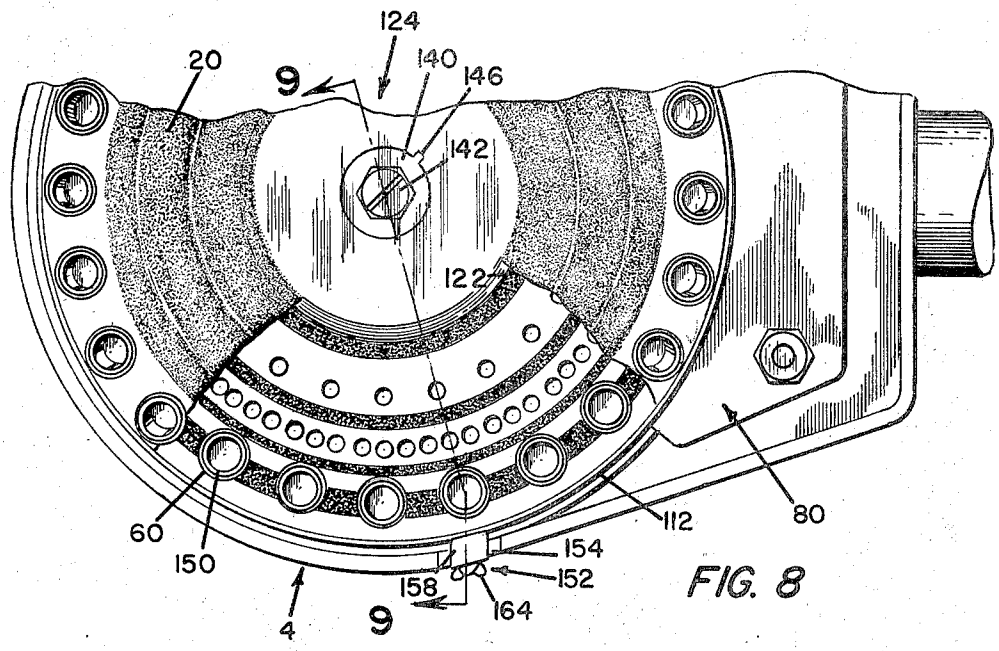


FIG. 8

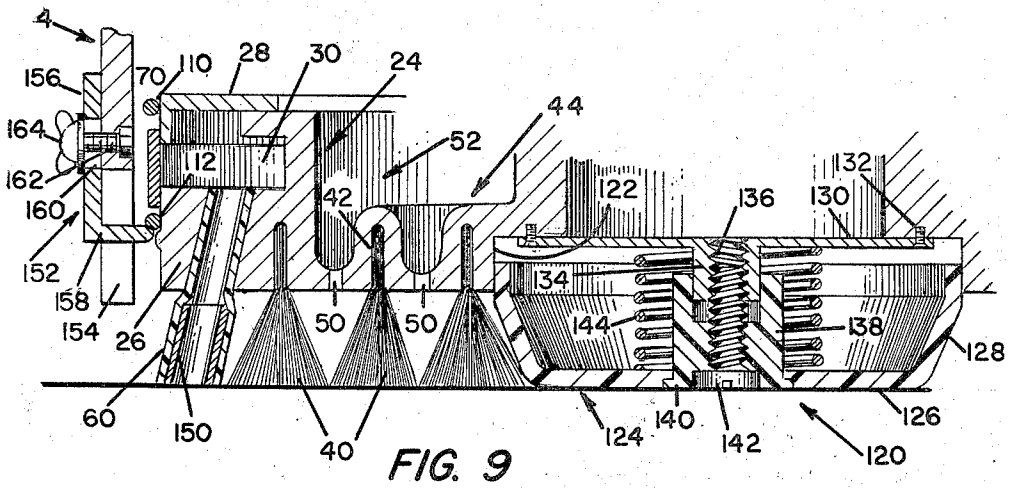


FIG. 9

Henry G. Tuthill, Jr.
INVENTOR

BY Donald A. Kaul
ATTORNEY

United States Patent Office 3,189,930 Patented June 22, 1965

3,189,930

SURFACE CLEANING APPARATUS

Henry G. Tuthill, Jr., Los Angeles, Calif.
(11409 Cherrylee Drive, El Monte, Calif.)

Filed June 16, 1964, Ser. No. 391,349
24 Claims. (Cl. 15—320)

This application is a continuation-in-part of my application, Serial No. 174,004, filed February 19, 1962, now abandoned, and entitled "Surface Cleaning Apparatus."

This invention relates to improvements in or with respect to surfacing apparatus, and finds particular utility when embodied in a floor, or floor covering cleaning machine.

In cleaning floors, and/or floor coverings, and particularly rugs, carpets and the like, it is common practice to apply some form of cleaning solution to the surface to be cleaned, to then scrub such surface with such cleaning solution, and to thereafter remove the cleaning solution by means of absorbents, sponges, or vacuums. While these steps can be carried out individually, and by means of simple pieces of apparatus, it has been found desirable to provide a single machine adapted to simultaneously apply the cleaning solution, scrub the surface to be cleaned with the same, and remove the cleaning solution.

Moreover, equipment has heretofore been suggested for performing a surface cleaning operation in the above prescribed manner with movement of the equipment over a given surface. Such equipment normally incorporates a fluid reservoir for storing the cleaning solution, a source of vacuum, a drive means usually in the form of a motor, and a brush member adapted to be driven by the motor to perform the scrubbing operation. An overall frame is provided for supporting the various components whereby the brush, usually circular in form, is rotated in operation, fluid is supplied to the bristles thereof, and the vacuum is used for purposes of removing the cleaning solution.

The instant invention is directly applicable to a machine of the type described in the preceding paragraph, and has as its principal object, the provision of improvements in such a machine, which improvements yield a more efficient cleaning operation, and simplify apparatus fabrication and repair, as well as part replacement.

More specifically, primary objects of the present invention are: (*a*) to provide in a surfacing apparatus of the aforesaid type, an improved form of brush assembly and vacuum means cooperating therewith; (*b*) to provide in such an apparatus a novel and improved form of brush member which itself carries peripherally disposed vacuum conduits, as well as a fluid distribution channel adapted to supply cleaning fluid to the bristle groups of the brush disposed in spaced relation to the vacuum conduits; (*c*) to provide such an improved brush member wherein the vacuum conduits are interspersed with the bristle groups so that efficient scrubbing is achieved over the entire area covered by the brush; (*d*) to provide an apparatus as described above wherein the brush member comprises a driven support having bristles depending therefrom, which support has a peripheral vacuum chamber; (*e*) to provide such an apparatus having such a support wherein the vacuum chamber is defined by the support itself and a belt extending therearound, and wherein an auxiliary chamber is disposed adjacent one portion of the periphery of the support and cooperates with the belt moving therethrough so as to maintain a vacuum within the confines of the belt; and (*f*) to provide improvements in surfacing apparatus as set forth in the preceding portions of this paragraph, which improvements can be utilized with existing rug cleaning machines or the like, as well as embodied in newly constructed machines of such types.

Still further, and in addition to the aforesaid objects, important auxiliary objects of the instant invention are: (1) to provide an improved brush member for use with

a surfacing apparatus which brush member is readily adapted for use in apparatus embodying the overall aspects of the instant invention; (2) to provide simple and efficient means for movably maintaining a belt in contact with a support of the type provided hereby on opposite sides of a given fractional portion of the circumference thereof in spaced relation to the circumference adjacent such fractional portion, and means cooperating therewith for defining a vacuum chamber adjacent said portion; and (3) to provide certain structural arrangements particularly advantageous in the means referred to in sub-paragraph (2).

Broadly, and in its simpler aspects, the invention provides in a surfacing apparatus having a fluid reservoir, a source of vacuum, and drive means, the improvement comprising the combination of a brush member including a support driven by the drive means and having a circular circumferential area with a peripheral passageway therein communicating with the exterior of the support about the area, a plurality of bristle groups depending from the support to define a brush surface, conduit means carried by the support and extending between the passageway and the surface, means intermediate the passageway and the center of the brush member for communicating the reservoir with the bristle groups, a belt passing about the circumferential area of the support, means for movably maintaining the belt in contact with the support over the circumferential area on opposite sides of a given fractional portion thereof, and in spaced relation to such area adjacent such portion, and means communicating with the source of vacuum and cooperating with the means for movably maintaining the belt so as to define a vacuum chamber adjacent the aforesaid portion of the circumference of the support whereby a continuous vacuum can be created in the passageway and the first conduit means when the apparatus is operated, and simultaneously fluid can be supplied through the bristles to the surface being operated upon.

The invention lies in such improvement as well as the combination, construction and arrangement of the various components thereof, as will be more fully apparent after consideration is given to the following detailed description. Such description refers to the annexed drawings presenting the preferred and illustrative embodiments of the invention.

In the drawings:

FIGURE 1 is a side elevational view of a machine embodying the invention;

FIGURE 2 is a fragmental view, partially in section, of the brush portion and lower hood of the machine shown in FIGURE 1;

FIGURE 3 is a sectional view, partially broken-away, taken on the line 3—3 of FIGURE 2;

FIGURE 4 is a fragmental detailed view of the forward end of the brush section and lower hood portion presented in FIGURE 2;

FIGURE 5 is a sectional view taken on the line 5—5 of FIGURE 2;

FIGURE 6 is a bottom plan view, partially broken-away, of the machine shown in FIGURE 1;

FIGURE 7 is a semi-schematic view showing the disposition of the fluid outlet and vacuum intake channels incorporated in the apparatus provided hereby, and the relative location of such channels with respect to the rotational path of the brush member;

FIGURE 8 is a fragmental bottom plan view, partially broken-away, of the machine shown in FIGURE 1 and having some additional features incorporated therein; and

FIGURE 9 is a sectional view taken on the line 9—9 of FIGURE 8.

Referring now more particularly to the drawings, in

FIGURE 1, the overall machine embodying the invention there presented is designated by the numeral 2. Such machine comprises a hood section 4, a motor 6 mounted above the hood section, a handle 8 extending upwardly from the hood section, a vacuum apparatus generally designated by the numeral 10 carried above the hood and cooperating with the motor 6, and a fluid reservoir 12 supported on the handle 8. The vacuum apparatus 10 includes a drive 14 cooperating with the motor 6, a vacuum fan section 16, an inlet section 18, and an exhaust bag 19.

Attached to the motor, and depending below the hood section 4 is a brush member 20 defining a substantially flat lower brush surface 22 contacting the floor covering 23 to be cleaned. In operation, a valve 11 in a line 13 extending from the reservoir 12 is opened to pass fluid to the brush member 20, and the switch 9 is activated to start the motor 6. Thereupon, the motor 6 drives the brush 22 and fluid is fed from the reservoir 12 to the brush.

In accordance with the present invention, the fluid which is passed to the brush is scrubbed by the brush member on the covering 23, and then evacuated from the area of the brush by means of a novel vacuum takeup. The vacuum takeup is explained more fully below, but it should be understood at the outset that the basic machine described hereinabove is merely one type with which the present invention may be used. The particular form of motor drive, hood section, vacuum apparatus, fluid reservoir, and handle form no substantial part of the instant invention and the construction thereof may be varied as desired. At the same time, it is important to understand that the invention lies in the combination of certain improved features provided hereby with an apparatus of the general type described above, and also in the construction of the improved brush member or assembly described below.

If reference is now made to FIGURE 2, it will be noted that the brush member 20 includes a support 24 coupled by a conventional hub connection 43 to the motor 6 whereby the support is driven by such motor. The support 24 is formed of a main section 26 and a skirted ring section 28. The main section 26 is preferably cast, and provided with a peripheral channeled recess 30 which is closed on its top, and partially closed about its periphery by the depending skirt portion 29 of the ring section 28. FIGURE 4 presents this construction most clearly, and by reference thereto, it will be noted that the brush member as so formed by the main section and the ring section, has a peripheral passageway which is designated in FIGURE 4 by the numeral 32. The skirt portion 29 of the ring section 28 terminates in spaced relation above the bottom wall 34 of the recess 30 and thus, there is an opening 36 extending peripherally about the support 24.

Inwardly of the circumference of the support 24, a plurality of bristle groups 40 are provided. Such bristle groups have end portions disposed in recesses 42 in the bottom wall 44 of the support member 24.

The support 24, in the embodiment of the invention presented in the drawings, is circular and formed with a peripheral channel ring portion defined by the peripheral portion of the main section 26 of the support and the skirted ring section 28, and has a central hub coupling portion adapted to cooperate with the conventional hub connection generally designated by the numeral 43. The bottom wall 44 of the main section extends between the peripheral ring portion and the hub coupling portion, and aside from carrying the bristle groups, is provided with a plurality of apertures 50. A fluid distribution channel generally designated by the numeral 52 exists above well 44 by virtue of such construction.

The hose 13 leading from the fluid reservoir 12 (FIGURE 1) extends into the fluid distribution channel 52 so that cleaning fluid may be deposited therein, and since this channel, or the bottom wall thereof, is provided with apertures, the same forms means for communicating the reservoir with the bristle groups.

As explained more fully below, the fluid which is introduced through the hose 13 and the distribution channel 52 onto the bristle groups, and which in turn is scrubbed into the rug or the like being cleaned, is ultimately removed from such rug or other floor covering via vacuum conduit means disposed about the periphery of the brush.

If reference is again made to FIGURE 2, it will be noted that a plurality of tubular conduits 60, fixed to the main section 26 of the support 24 extend downwardly from the support and terminate adjacent the brush surface 20. The conduits 60 are preferably flexible plastic tube pieces open at opposite ends, the lower ends contacting the rug or the like being cleaned, and the upper ends communicating with the passageway 32 extending about the periphery of the support.

In order to maintain a vacuum within the peripheral passageway 32, a belt 70 (best shown in FIGURE 5) passes about the periphery of the support member 24. This belt extends over the opening 36 therein substantially over the entire periphery of the support member. However, on the right side of the support, as shown in FIGURES 2 and 5, the belt is maintained in spaced relation to a fractional portion of the periphery of the support member.

As shown in FIGURE 2, a frame generally designated by the numeral 80 is disposed adjacent the circumference of the support 24. This frame comprises a pair of plate members 81 and 82 which are maintained in spaced apart relation by a plurality of sleeves 83 having bolts 84 passing therethrough and extending between the top surface of plate 82 and the bottom surface of plate 81. The bottom plate 81 of the frame is best shown in FIGURE 7, whereas the top plate 82 of the frame is best shown in FIGURE 3. The collars 83 maintain the plates in spaced relation so that the same extend parallel to one another and on opposite sides of the adjacent opening 36 in the periphery of the support member 24.

Fixed between the plates 81 and 82, as best shown in FIGURE 5, are a pair of walls 90 and 92. The wall 90 comprises a plate member extending from adjacent the periphery of the support member 24 to the right, and terminating in a curved tip 91. The wall member 92 preferably comprises a rearwardly facing C-shaped bracket 93 having a retained member 94 cooperating therewith. The retaining member 94 comprises a strip recessed centrally as at 95 and extending between opposite ends of the C-shaped member 93 so as to maintain the same in position when the recess 95 of the retaining member receives the stud 96. Disposed between the retaining member 94 and the C-shaped member 93 is a leaf spring 97 which continually urges the outer face of the C-shaped member away from the retaining member. The C-shaped member, as shown, extends from a point adjacent the periphery of the support 24 rearwardly so that the opposite end thereof overlaps the tip of the curved end portion 91 of the wall 90.

The wall 90 is preferably frictionally maintained in position, but in order to prevent inward movement of the curved end portion 91 thereof, a stop 98 is preferably fixed to the plate member 81 so as to extend in abutting relation to the curved portion 91 as shown.

With the construction described above, the belt 70 passes forward of the front face of the C-shaped member 92 and behind the wall 90. The frame is supported on the apparatus in normally slightly spaced relation from the periphery of the support 24 whereby the support is rotatable but the frame is fixed. The belt 70 is thus caused to move with rotation of the support 24 through the frame 80. During its movement through the frame 80, the belt is maintained in spaced relation to the periphery of the support 24, thus communicating within such frame, the peripheral opening 36 with the area between the plates 81 and 82 forming the frame 80.

The top plate 82 of the frame 80 has an opening 100 therein, which, as shown in FIGURE 3, is disposed in

overlying relation to the area within the belt 70, or between the belt 70 and the periphery of the support 24. The belt itself, by cooperation with the walls 90 and 92 defines a chamber between the plate members 81 and 82, which chamber communicates with the passageway or opening 36 in the periphery of the support member 24. In accordance with the invention, as shown in FIGURE 2, a coupling 104 is fixed above the opening 100 in the plate member 82, and this coupling communicates with the interior of the inlet chamber 18 of the vacuum apparatus. Thus, a vacuum is created in the chamber between the plates 81 and 82, which vacuum is transmitted to the peripheral passageway 32 in the support 24, and in turn transmitted to the conduits 60 to the surface of the rug being cleaned.

From FIGURES 3 and 5, is should be readily apparent that the plate members are formed with arcuate ends adjacent the periphery of the support member and that accordingly the frame has an arcuately-shaped opening in the end thereof adjacent the periphery of the support member. It should also be apparent from FIGURE 2 that the frame is preferably supported by the coupling 104 which in turn is fixed to and supported by the vacuum apparatus in any suitable manner.

For purposes of maintaining a proper sealing relationship between the vacuum chamber within the frame 80 and the passageway 30 within the support 24 preferably a pair of O-rings 110 and 112 are stretched over and carried about the periphery of the support 24 on opposite sides of, and in spaced relation to, the belt 70. These O-rings cooperate with the sloped forward ends 81' and 82' of the plate members 81 and 82, respectively, and during rotation are maintained in position by the vacuum within the chamber between the plates which tends to pull the O-rings into proper position.

FIGURE 3 presents the detailed construction of the preferred form of hub connection 43 utilized in and with the improved brush and apparatus provided hereby. Such connection includes a hub plate 115 having recesses 116 therein adapted to pass over cooperating interlocking projections on a coupling extending from a motor shaft in conventional manner. Since the coupling is conventional and may be varied as desired, further description thereof appears unnecessary.

Although reference has been briefly made to the tubular conduits 60 supported continuously in spaced apart relation about the periphery of the brush member, it is important to understand that these conduits, for most efficient operation, are disposed, as shown in FIGURE 7, with their longitudinal axes sloped rearwardly with respect to the path of movement of the brush member. In FIGURE 7, the path of movement is shown to be counterclockwise, and the top and bottom ends of the conduits, shown respectively in solid line and phantom, indicate the direction of slope of the conduits. Also from FIGURE 7, it will be noted that arrows are presented therein to show the direction of travel of fluid from the apertures 50 toward the intake ends of vacuum conduits 60. Similarly, the arrows surrounding the periphery of the brush member 22 there shown indicate the direction of travel of incoming air. In other words, FIGURE 7 presents the method of operation of the present apparatus wherein cleaning fluid is discharged to the bristle through the apertures 50, scrubbed into the covering being cleaned, and then taken up through the vacuum conduits 60. In this manner, as the machine is moved over a surface, such surface is continuously cleaned, and there is no need for using separate pieces of apparatus. Moreover, and most important, a vacuum is maintained within the brush member itself, by virtue of the provision of the peripheral passageway and cooperating means including the frame 80 which serves as means for defining a vacuum chamber, and the respective walls 81 and 82 therein which cooperate with the frame to maintain the belt 70 in spaced relation to the periphery of the support 24 within the frame, but in contact with the periphery of the frame, and in closing relationship to the passageway 32, about the remainder of the circumference of the support 24.

Although attention has not been specifically directed to the exact configuration of the hood section 4, it will be noted from FIGURE 3, as well as FIGURE 2 that the same preferably comprises a conventional cover-type member having a depending skirt portion. Of course, the cover member is shaped so as to extend about the frame 80 and provide for an attractive appearance, but the particular form of hood section, vacuum apparatus, motor, handle, and/or fluid reservoir, as explained above, may be varied without departing from the scope and spirit of the invention.

It will, of course, be apparent that various additional modifications may be utilized to enhance the operational characteristics of the basic surface cleaning apparatus. As an example, FIGURES 8 and 9 show a brush crush stabilizer means generally designated 120 and mounted within a central recess 122 in the underside of the bottom wall 44. The recess 122 ordinarily permits access to the hub assembly 43, as shown in the bottom view of FIGURE 6, to allow the brush assembly to be detached from the motor 6, if desired. The stabilizer means 120 includes a cup-shaped plastic member 124 preferably fabricated of a semi-soft plastic such as polyethylene, and having a bottom wall 126 and an integral upstanding side skirt 128 which projects into the recess 122 to frictionally contact the sides thereof. The bottom wall 126 contacts floor covering 23 and acts as a squeegee to squeeze out spots and heavily soiled patches. It also serves to prevent the tubes 60 from bearing heavily upon the covering 23 and causing excessive wear and tear on either the tubes, the covering, or both. Since the plastic material of the bottom wall 126 slides easily across the floor covering 23, there is no appreciable drag involved and hence there is a reduction in the amount of energy which must be exerted to accomplish relative movement between the apparatus 2 and the floor covering 23. The side skirt 128 tapers slightly between the open end and the bottom end 126 and, as such, provides a support to prevent the inner band of brush bristles 40 from folding or crushing inward beneath the recess 122. Finally, and perhaps most important, the stabilizer means 120 prevents all of the bristles 40 from bearing down so heavily upon the floor covering 23 that they become crushed or folded. Without the presence of the stabilizer means 120, the brushes tended to wear upon their sides and hence to produce a less effective brushing action.

The cup-shaped member 124 is adjustably mounted within the recess 122 to permit a selective up and down adjustment which varies the position of the bottom wall 126 with respect to the bottom of the bristles 40. The mounting means includes a brace 130 which is attached to the bottom wall of the recess 122 by suitable means such as bolts 132. A central boss 134 depends from the brace 130 and is provided with a threaded internal bore 136. Beneath the boss 134, the bottom wall 126 is provided with an aligned countersunk hole to accommodate a sleeve 138 which projects through the hole toward the boss and a head portion 140 which rests within the countersink. The walls of the sleeve 138 surround the boss 134 to thus serve as a guide for the up-and-down movement of the cup-shaped member 124. The sleeve 138 is provided with a threaded internal bore, similar to and aligned with the bore 136, so that a threaded screw 142 can be threaded through both bores. The head of the screw is recessed into the sleeve 138 so it cannot contact the floor covering 23 and is provided with a conventional transverse slot for accommodating the usual scewdriver blade. A compression spring 144 surrounds both the sleeve and the boss and extends between the brace 130 and the bottom wall 126. As the screw 142 is turned in one direction, the spring 144 is compressed and the member 124 is moved into the recess 122, thus elevating its bottom wall 126.

When the screw 142 is turned in the opposite direction, the sleeve 138 moves away from the boss 134 and the spring expands, thus moving the member 124 out of the recess 122 and hence lowering its bottom wall 126. A lug 146 may extend from one edge of the sleeve head portion 140 into an aligned slot in the bottom wall 126, to assure that the member 124 rotates concurrently with the brush member 20.

As was previously described, the tubular conduits 60 are formed of flexible plastic and have flexible end portions which contact the surface of the floor covering 23. In order to increase the wearing characteristics of the tubular conduits 60 while still retaining their desired flexibility, it may prove desirable to employ tubular inserts 150 formed of a relatively rigid material such as metal or nylon. The conduits 60 are generally formed of an elastomeric plastic, such as a vinyl, and thus can be stretched to receive an insert 150 of approximately the same diameter and wall thickness as the conduit itself.

It was also mentioned previously that to maintain a proper sealing relationship between the vacuum chamber in the frame 80 and the passageway 30 within the support 24, a pair of O-rings 110 and 112 are mounted peripherally of the support 24 and are engageable respectively with the sloped edges 82' and 81' of the frame. During rotation, the vacuum within the vacuum chamber tends to pull the O-rings into engagement with their associated sloped edges. However, it is generally desirable to assure that the bottom O-ring 112 be positively engaged with the sloped edge 81' just as the two come into contact, and this cannot always be accomplished through mere vacuum pull on the O-ring. Instead, a means generally designated 152 is provided on the hood 4 to exert a slight upward pressure on the O-ring 112 just before it meets the sloped edge 81'. The means 152 is mounted within a slot 154 in the bottom of the skirt portion of the hood 4 and includes a L-shaped bracket having an upstanding leg 156 which is generally parallel to the hood skirt and a generally horizontal leg 158 which extends through the slot 154 and terminates just short of contact with the periphery of the support 24. The leg 156 has an enlarged hole 160 formed therein to permit a threaded bolt stem 162 to pass therethrough. The bolt stem may be removably or permanently affixed to the hood skirt 4 and projects outward beyond it a sufficient distance to receive wing nut 164 which can be digitally tightened to hold the leg 156 in tight contact with the hood skirt 4. Thus, the means 152 can be adjusted in position until the inner end of the leg 158 exerts just the proper amount of upward bias on the O-ring 112. When this proper position has been attained, the wing nut 164 is tightened to retain the position and hence the means exerts a slight upward pressure which assures positive contact between the O-ring 112 and the sloped edge 81' on the lower plate of the frame 80.

After reading the foregoing description, it should be apparent to those skilled in the art that the objects set forth at the introduction thereof have been successfully achieved by the invention as defined in the appended claims.

What is claimed is:

1. In a surfacing apparatus having a fluid reservoir, a source of vacuum, and drive means for rotating a brush member, the improvement comprising the combination of a brush member including a support driven by said drive means and having a circular circumferential area with an annular passageway therein adjacent the periphery of said support and communicating radially with the exterior of said support about said area, a plurality of bristle groups depending from said support to define a brush surface, conduit means carried by said support and extending between said passageway and said surface, means intermediate said passageway and the center of said brush member for communicating said reservoir with said bristle groups, a belt passing about said circumferential area, means for movably maintaining said belt in contact with said support over said circumferential area and said annular passageway on opposite sides of a given fractional portion thereof and in spaced relation to said area adjacent said portion, and means defining a vacuum chamber adjacent said portion whereby a continuous vacuum can be created in said passageway and said conduit means when the apparatus is operated.

2. The improvement defined in claim 1 wherein said passageway comprises a circumferential channel opening continuously around said circular circumferential area.

3. The improvement defined in claim 1 wherein said conduit means comprises a plurality of tubular conduits fixed to said support, and having at least flexible end portions and adjacent said surface.

4. The improvement defined in claim 3 wherein said tubular conduits comprise plastic tubes.

5. The improvement defined in claim 4 wherein said plastic tubes have rigid inserts mounted within said flexible end portions.

6. The improvement defined in claim 3 wherein said tubular conduits are disposed continuously and in spaced-apart relation about the periphery of said surface.

7. The improvement defined in claim 3 wherein said tubular conduits are disposed with the longitudinal axis thereof sloped rearwardly with respect to the path of movement of said brush member in operation.

8. The improvement defined in claim 7 wherein the terminal ends of said tubular conduits are flush with said surface.

9. The improvement defined in claim 1 wherein said means for communicating said reservoir with said bristle groups comprises a recessed area in said support having an apertured wall adjacent said bristle groups.

10. The improvement defined in claim 1 wherein said support is circular and includes an upstanding peripheral channel ring portion having said annular passageway therein, a central hub portion, and an apertured wall extending between the base of said ring portion and the base of said hub portion to define a fluid distribution channel between said portions, said channel forming said means for communicating said reservoir with said bristle groups.

11. The improvement defined in claim 10 wherein said support includes a bottom recess beneath said central hub portion and stabilizer means mounted within said bottom recess and extending downward substantially to said surface.

12. The improvement defined in claim 11 wherein adjustment means are provided for moving said stabilizer means relative to said surface.

13. The improvement defined in claim 10 wherein said conduit means comprise a plurality of tubular conduits fixed to and depending from said peripheral channel ring portion, said tubular conduits having at least flexible end portions adjacent said surface.

14. The improvement defined in claim 1 wherein said means for defining a vacuum chamber comprises a frame having one end thereof arcuately shaped and disposed adjacent said circular circumferential area, and wherein said means for movably maintaining said belt is carried by said frame.

15. The improvement defined in claim 14 wherein said frame comprises a pair of plate members, and means for supporting said plate members in vertically spaced-apart relation, said plate members defining an opening in said one arcuately shaped end of said frame, one of said plate members having an opening therein, and wherein said means for movably maintaining said belt comprises a pair of wall members extending between said plate members and defining a chamber between said plate members, said wall members having overlapping end portions in spaced relation to said arcuate end of said frame, said overlapping end portions being laterally spaced to permit passage of said belt therebetween, said

belt extending over the front of one of said walls facing said arcuate end and behind the other of said walls.

16. The improvement defined in claim 15 wherein said plate members have sloped edge surfaces adjacent said circumferential area and wherein said circumferential area is further characterized by a pair of surrounding O-rings disposed on opposite sides of said belt and engageable with said sloped frame member surfaces for sealing said vacuum chamber when said apparatus is operated.

17. The improvement defined in claim 16 but further characterized by means for biasing at least one of said O-rings to assure a positive contact with its associated frame member sloped surface.

18. The improvement defined in claim 17 wherein said means is adjustable whereby said bias can be varied.

19. The improvement defined in claim 15 wherein one of said side walls has a curved overlapping end portion, and further including means for yieldably supporting the other of said walls.

20. The improvement defined in claim 19 wherein said means for yieldably supporting one of said walls comprises leaf spring means, and said other wall comprises a plate cooperating therewith.

21. The improvement defined in claim 20 wherein said support is circular and includes an upstanding peripheral channel ring portion having said passageway therein, a central hub portion, and an apertured wall extending between the base of said ring portion and the base of said hub portion to define a fluid distribution channel between said portions, said channel forming said means for communicating said reservoir with said bristle groups, and whereon said conduit means comprise a plurality of

tubular conduits fixed to and depending from said peripheral channel ring portion, said tubular conduits having at least flexible end portions adjacent said surface.

22. A brush member for use with a surfacing apparatus, said brush member comprising a support having a circular circumferential area with a peripheral annular passageway opening radially outwardly of said support about said area, a plurality of bristle groups depending from said support to define a brush surface, conduit means extending between said passageway and said surface, said support having a fluid-receiving recess intermediate said passageway and the center of said brush member and apertures communicating said recess with said bristle groups thereunder.

23. A brush member as defined in claim 22 wherein said support is circular and includes an upstanding peripheral channel ring portion having said passageway therein, a central hub portion, and an apertured wall extending the base of said ring portion and the base of said hub portion to define said fluid-receiving recess between said portions.

24. A brush member for use with a surfacing apparatus as defined in claim 23 wherein said conduit means comprises a plurality of tubular conduits fixed to and depending from said peripheral channel ring portion, said tubular conduits having at least flexible end portions adjacent said surface.

References Cited by the Examiner

UNITED STATES PATENTS

2,168,692 8/39 Vidal ..... 15—320

WALTER A. SCHEEL, *Primary Examiner.*