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SURFACE-CLEANING AND RUG-SHAMPOOING MACHINES

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2 Sheets-Sheet 1

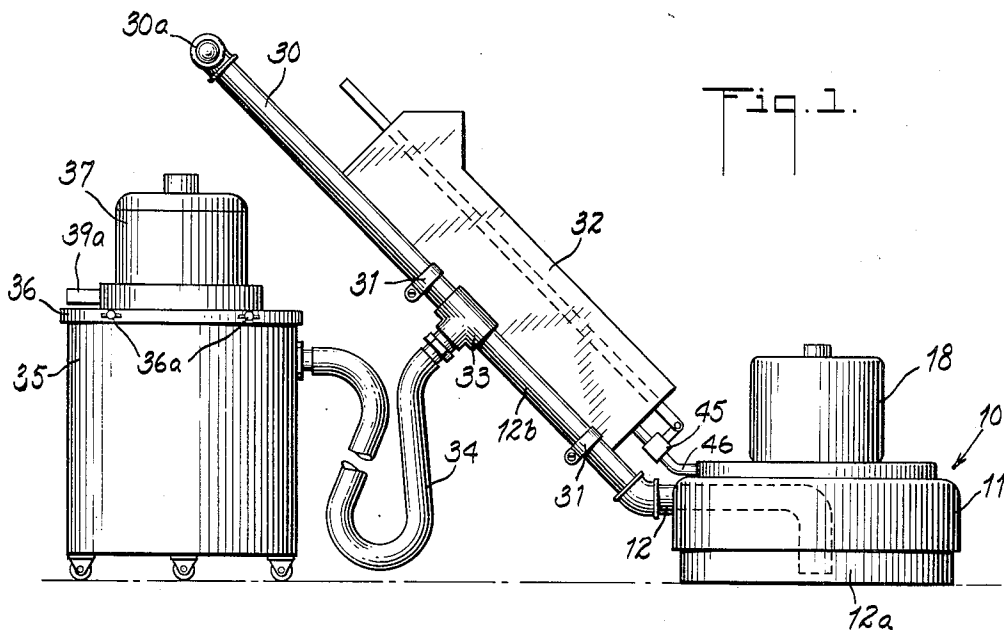


Fig. 1.

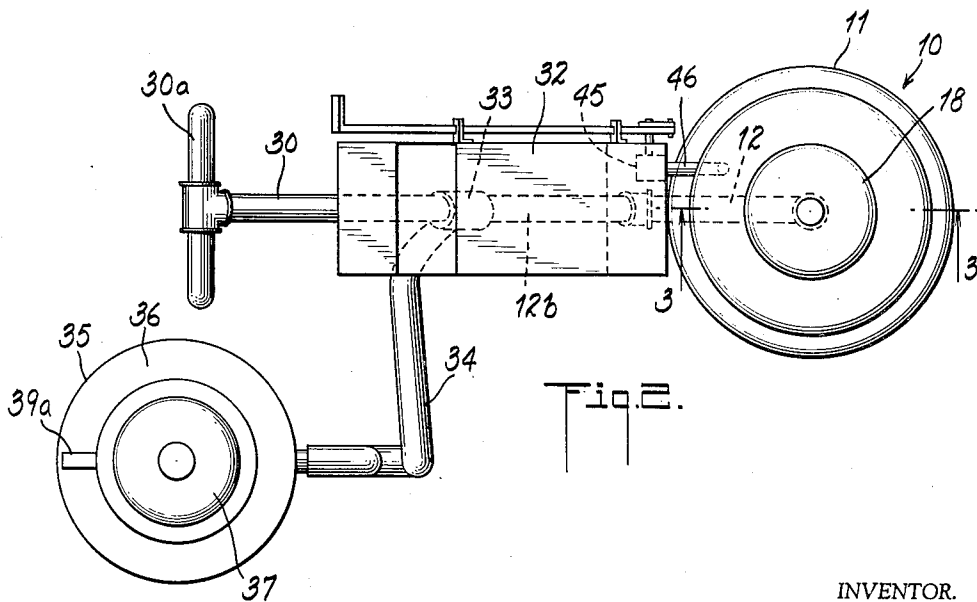


Fig. 2.

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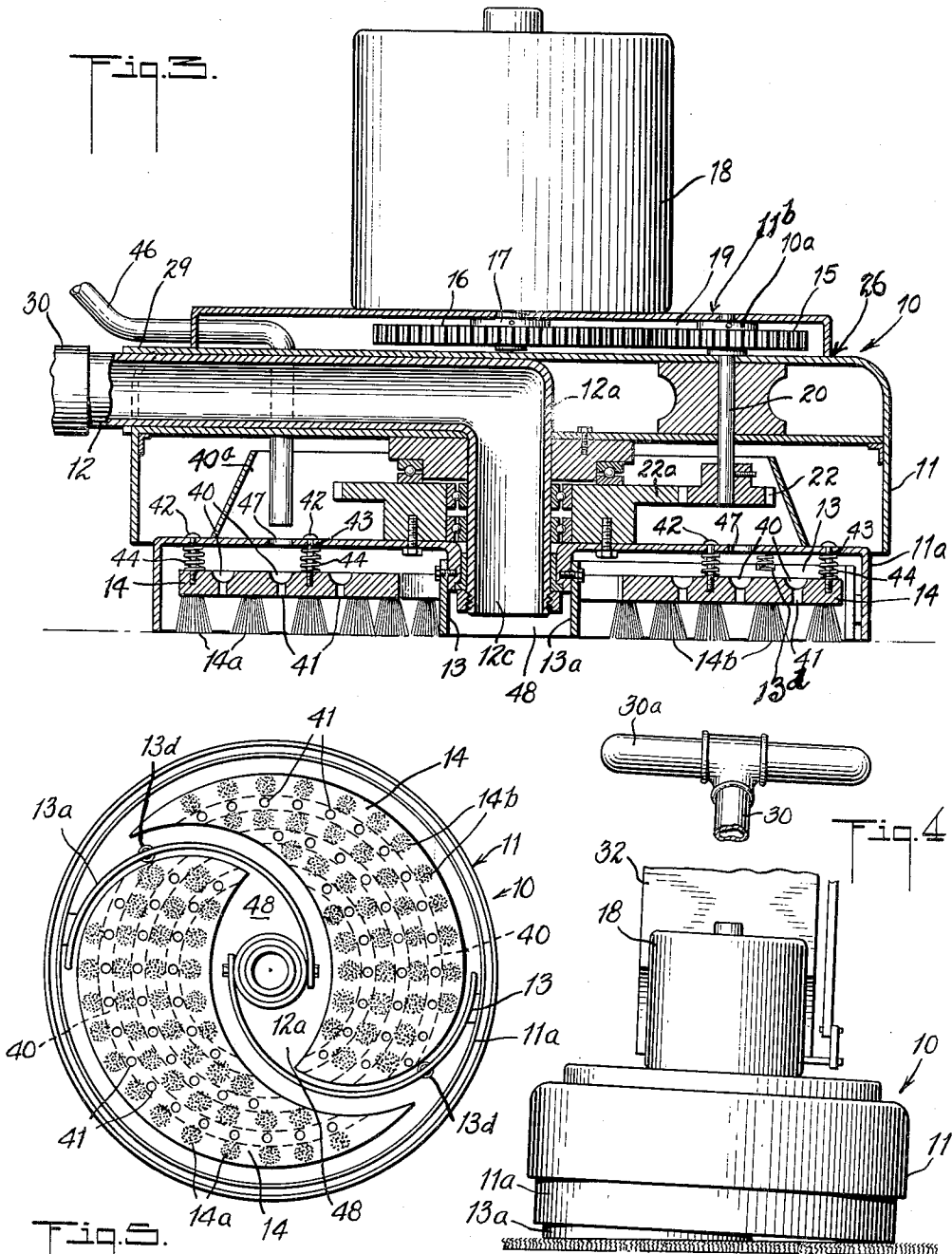
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SURFACE-CLEANING AND RUG-SHAMPOOING MACHINES

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 5 Claims. (Cl. 15—50)

This invention relates to improvements in surface-clearing and rug-shampooing machines.

My present invention is an improvement upon the invention shown and described in Letters Patent #2,633,595, dated April 7, 1953.

In said patent I provide a portable apparatus having a motor-driven rotatable head adapted by manual operation to be linearly moved or reciprocated for the purpose of efficiently scrubbing, shampooing and squeegeeing surfaces to be cleaned, and particularly for the purpose of so scrubbing and shampooing with a suitable cleaning agent the nap surfaces of rugs, carpets or the like so as to loosen and cause a suspension or solution of the dirt and grease, and then to remove from such nap surfaces the spent cleaning agent with such dirt and grease, said apparatus also embodying a vacuum or suction element for applying suction or vacuum at the axis of the rotatable head to collect or gather spent liquid cleaning material, dirt and grease at such axis and thus to provide a removal center for the same.

In said machine I provide the rotatable head with scrubbing brushes to scrub a given surface and employed squeegee devices operating over the same area for guiding and deflecting the used fluid and dirt to said removal center.

Another feature of said patented invention was to utilize a squeegee device having a portion extending along the outer perimeter of a revolvable head to provide along said perimeter a perimetric protecting apron to prevent splashing or centrifugal spreading of the cleaning material and to combine therewith another portion continuous with said perimetric portion and extending from said perimetric portion to the axially-located suction pipe.

In rug-cleaning machines of the patented type under consideration when the machine is manually moved from left to right or right to left, the cleaning head is slightly tilted in relation to the rug in order to more readily allow such manual movements of the machine; and, in accordance with my present invention the squeegeeing elements of the cleaning head are modified and so mounted as to take up the slack of such tilting, and it is one of the objects of this invention to cause modification of the squeegee element of said patented construction whereby, irrespective of the tilting of the head from left to right or right to left, a portion of the squeegee element will be retained always in flat condition on the surface of the rug, and in accordance with my present invention the squeegee element will be formed into three parts or portions, one comprising a perimetric portion at the outer perimeter of the head upon which said squeegee perimetric portion is mounted. This squeegee perimetric portion will be mounted on the perimeter of the head and will be slightly tilted when the machine is going from left to right or right to left, as above indicated, in the operation of the machine, while two interior spiral portions of the squeegee inside said perimeter of the head will be pivotally mounted adjacent to the axis thereof and will be pressed downwardly by spring pressure for the purpose of producing a movement of such interior spiral portions that will compensate for and close up within the head the slight mount of space produced by tilting during manual movement of the head. The said pivotal mounting of these spiral squeegee portions and downward movement thereof caused by spring pressure thereon will cause such squeegee parts comprising the spiral parts inside the perimeter to be held and

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maintained flat on the rug at all times. This is due to the shapes and positions of the squeegee spiral portions and the utilization of spring pressure applied on said parts, which during operation of the machine causes the movement of the part inside the perimeter. Said spiral parts of the squeegee mechanism are preferably formed of aluminum and the spring pressure on them causes each of them to be moved up and down slightly so as to flatten out in the plane of operation. The movement is really a centrepedal action because such movement of each of the members is from the perimeter toward the center and it is this movement that will take up the slack caused by the tilting movement of my machine. It will be understood that the only way my machine can be moved is by a tilting action and pressure on the handle is required to cause such movement of the machine back and forth or from left to right or right to left. During such movement operation of the machine will be hindered. However, so soon as the pressure is relieved and the machine goes into operation, the spiral squeegee part will flatten out and will take up and compensate for any space which in my earlier patented construction would comprise an unobstructed slot caused by said tilt but which in the present instance is compensated for and closed up by said spiral squeegee part.

In the preferred form of my present invention I also preferably mount the brush holders movably on pins passing through fixed parts of the head and then cause said holders to be subjected to spring pressure to produce a resilient mounting by applying springs on the mounting pins between fastening elements therefor and a fixed portion of the head, thus providing a highly resilient contact between said brushes and the surface which is being scrubbed or cleaned thereby.

With these and other objects in view, the invention comprises the combination of members and arrangement of parts so combined as to coact and cooperate with each other in the performance of the functions and the accomplishment of the results herein contemplated, and comprises in one of its adaptations the species or preferred form illustrated in the accompanying drawings, in which:

FIG. 1 is a view in side elevation of apparatus embodying my invention;

FIG. 2 is a view in plan of the apparatus shown in FIG. 1;

FIG. 3 is a vertical section partly broken away substantially through the center of the rotary rug shampooing head shown in FIGS. 1 and 2;

FIG. 4 is a section of a rug mounted on a flat surface and a view in side elevation of my operating head arranged in tilted position relatively thereto and showing my automatically-actuated spring-pressed squeegee lowered into contact with the rug; and

FIG. 5 is a bottom plan view of the operating head.

In accordance with the preferred form of my invention illustrated in FIGS. 1 to 5 inclusive, I utilize a circular head and provided on the bottom surface thereof a squeegee mechanism composed of a circular perimetric portion extending completely and continuously around the perimeter of the head and two independently mounted inwardly-directed liquid-guiding portions of general spiral conformation, each abutting though not connected at its outer end to the circular perimetric portion and having its concave face extending in the direction of rotation and being disposed to extend in a spiral path to the axis of the head, and to terminate at said axis adjacent to a suction tube arranged coaxially with said head. Said transverse squeegees 13 and 13^a divide the area within the wall 11^a into a pair of areas of substantially spiral shape within which brushes are located.

Referring now to FIGS. 1 to 5 of the drawings, which illustrate a preferred embodiment of my invention, the

machine shown therein comprises a circular head 10 having a gear enclosing casing 11 preferably of cast metal. This casing supports at its axis a vertical section of a vacuum or off-take pipe 12 for sucking up and removing spent cleaning material and loosened dirt. This material is guided to the axis of the head 10 by transverse squeegee members 13 and 13^a and by brushes 14^a—14^b mounted in holders 14 in the space beneath the head 10 and rotatable about the vertical axis of the pipe 12.

In my said preferred form of the invention, the head 10 has a driven ring-gear 15 fixedly mounted on an integral upwardly-extending hub 10^a which rotates on the member 11 as a fixed shaft. Said driven gear 15 is rotated from a drive gear 16 mounted on motor shaft 17 of motor 18. The motor and shaft are mounted endwise with the shaft 15 in vertical position above an axially-disposed gear mounting aperture 19 in the gear-enclosing casing member 11. As illustrated, transmission shaft 20 is supported and mounted in said gear casing 11^b in position radially of and parallel to said axis; this shaft 20 is provided with transmission gears 22—22^a connected with said driven and drive gears 15 and 16, the casing 11^b being provided with suitable bearings for the shaft 20.

Said gear-casing 11^b is provided with an extension thereto of the hub 10^a of driven gear 15 and has an open circular base portion 26 which abuts the top surface of the head 10. The said casing is provided with suitable openings to permit lubrication of the shaft 20 and gear 22 and is also provided with a cylindrical radial extension 29 adapted to support a horizontally-disposed section 12^a of said suction pipe 12, said extension 29 also being adapted to support an inwardly-extending handle-tube 30 to which is connected and mounted by straps 31 a cleaning-liquid-reservoir 32. The handle-pipe 30, as shown in FIG. 1, is provided with a cross-bar handle 30^a and has for a part of its length mounted therein an upwardly-extending section 12^b of the suction pipe 12. Said upwardly-extending section 12^b is provided intermediate the ends of the tube 30 with a suitable connection member 33 to which is connected a vacuum hose 34 which extends to a portable vacuum tank 35 provided with a suitable cover 36. As illustrated in FIGS. 1 and 2, the vacuum tank 35 is composed of metal and has mounted at its upper end a cover 36 on which is mounted a conventional vacuum-producing element 37 comprising a motor and fan adapted to cause a suction inside the tank and through the hose 34 and suction pipe 12, connection 33 and suction pipe sections 12^b and 12^a, respectively, said section 12^a being extended as aforesaid through the head to the axis thereof and the inlet 12^c of said pipe 12 being positioned at said axis closely adjacent to the surface to be cleaned and within the area bounded by the perimetric portions of the squeegee members 13 and 13^a.

Parts of said squeegee members 13 and 13^a are suitably positioned, first, to surround and enclose cleaning material fed to the surface beneath the head, and thereafter to guide the spent cleaning material to the axis of the head and to an area adjacent to the entrance 12^c of the section pipe or conduit 12, whereupon the suction means hereinabove described causes the material to be sucked up and passed to the tank 35 which is preferably provided with a suitably controlled air outlet 39^a. The cover is suitably fastened by swingable bolts 36^a mounted on the outer surface of the tank and having wing nuts at their upper ends adapted to engage the cover 36.

A suitable quantity of cleaning fluid is supplied to the tank 32 and this cleaning fluid is charged to the head through a circular channel 40^a which, as shown, is mounted on the head inside the casing 11 and, as illustrated in FIGS. 3 and 5, the said channel is provided with a series of vertical bores 47 extending downwardly from such channels 40^a through the head to the bottom surface thereof. These bores are located adjacent to the perimeter to permit the material fed to such channels to reach the surface to be cleaned below the body portion 11^a of

the head and within the area bounded by the squeegees 13 and 13^a within which the brushes 14^a—14^b operate.

An important feature of my present invention comprises the provision on the bottom surface of the head of a special squeegee mechanism 11^a which is composed of a circular perimetric portion extending completely and continuously around the perimeter of the head and a pair of inwardly-directed liquid-guiding sectional squeegee portions 13—13^a which are pivotally connected at one end to the inlet pipe 12^c at the axis of the head (see FIG. 3) and also are connected though not fastened at their other ends to the perimetric portion of the circular squeegee 11^a. The said sectional squeegee portions 13, 13^a have the concave face thereof extending in the direction of rotation of the head and are disposed to move with the head in spiral paths. These paths extend to the axis of the head and terminate at opposite sides of said axis in adjacency to the entrance 12^c of the axially located suction tube 12. Each of said inwardly directed portions comprises a continuous member having the shape of a segmental spiral between the outer surface thereof and the inner surface of the perimetric portion and each of these members is pressed downwardly by springs 13^d thus causing the edge of the sectional squeegee members to be pressed downwardly and to resiliently contact with the surface of the rug being cleaned.

The brushes 14^a—14^b, which are of similar segmental spiral or crescent shape but of much greater width, are located also between the pipe terminal 12^c and the circular squeegee member 11^a.

In said preferred embodiment of my invention the brushes 14^a—14^b conform to the shape of said area in which they move and are each formed in a substantially crescent shape with curved edges of a segmental spiral shape, and each has portions reduced in width at opposite ends and increased in width at the middle section thereof. Said brush holders begin at a point adjacent to the outer perimeter of the head and terminate at a point adjacent to the axis thereof and for a portion of its length each brush holder extends in substantially parallelism to the inwardly-directed squeegee portion, and preferably will leave at opposite ends relatively small bare sections of the head which are free of the brush-holders.

In said preferred embodiment shown, the brush holders 14 comprise brush-backs and such brush backs are mounted on projected pins or flanged connecting members 42 which pass through apertures 43 in the head and have spiral springs 44 arranged in a housing cavity in the head and adapted to resiliently press the brush-back outward, thus causing the brush-bristles to resiliently contact with a rug or other surface to be scrubbed.

In said preferred form of my invention, the pins or connecting members 42 provide a resilient mounting and a readily releasable connection of the brushes with the head.

The operation of my apparatus is as follows: the tank 32 is filled with a suitable cleaning material and manually moved into position over a rug surface to be cleaned. The motor 18 is then started to revolve the head and the valve 45 is opened to permit liquid to pass through the channel 46 and through the perforations 47. This material is then thoroughly brushed into the rug by the brushes and the same area of the rug which is so brushed with the said material will be squeegeed by the two sectional squeegee members and the spent material and dirt will be deflected inwardly toward the axis of the machine by the members, a large part of the material, after brushing, following the channels 48 to the gates or entrances between adjacent segmental squeegee members and to an axial position directly beneath the pipe 12^a through which vacuum or suction being applied will suck up the spent and deflected material and cause the same to be conducted into the vacuum tank 35. Of course, the machine or apparatus will be manually moved or reciprocated from spot to spot over the rug so that the entire rug will be treated

and thoroughly cleaned. It will be seen that in accordance with my invention the used or spent cleaning material with its load of dirt and grease is conducted inwardly by the deflecting portions of the squeegee members and that the perimetric portions of the squeegee members not only assist in deflecting the material but prevent such material from being scattered or broadcast through centrifugal motion of the head and said squeegee members definitely act as confining elements as well as squeegee members.

By moving the portable apparatus with a reciprocatory motion the cleaning liquid may be thoroughly brushed into the rug both by the reciprocating and revolving motions and the cleaning liquid with its load of dirt will be confined and prevented from spreading by the rotation of the head and furthermore will be continuously deflected by the squeegee portions toward the center of the head where it is sucked up by the tube 12^a.

Having described my invention, I claim:

1. A surface-cleaning and rug-shampooing machine which comprises a casing having a downwardly extending off-take pipe open at its lower end, a horizontal annular disc rotatably mounted on said off-take pipe and having a downwardly open, vertical, cylindrical squeegee wall depending from its outer periphery, a pair of transverse squeegees on diametrically opposite sides of said off-take pipe below said horizontal disc and extending from said off-take pipe in a curved path tangent to said off-take pipe to a position adjacent to said cylindrical squeegee wall, a pair of brushes in the space within said cylindrical squeegee wall on opposite sides of said transverse squeegees to brush on a surface to be cleaned, and sup-

porting springs between said horizontal disc and said brushes and transverse squeegees whereby said casing and said horizontal disc are spring supported on said brushes and said transverse squeegees to permit tilting of said casing and said horizontal disc relative to the surface on which said brushes and said transverse squeegees are supported.

2. The machine of claim 1 having a motor and power transmitting means in said casing to rotate said horizontal disc and said brushes and transverse squeegees.

3. The machine of claim 2 in which said horizontal disc and said brushes have openings for the downward flow of cleaning fluid and which comprises a circular wall on said horizontal plate enclosing said openings through said plate and a liquid delivery pipe delivering to the space within said circular wall.

4. The machine of claim 1 in which said transverse squeegees extend from diametrically opposite positions on said off-take pipe in a curve to diametrically opposite positions on the squeegee wall.

5. The machine of claim 1 in which said transverse squeegees divide the area within the squeegee wall into a pair of areas of substantially spiral shape and in which said brushes conform to the shape of said areas.

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