Dec. 21, 1965 K. G. BRODIE 3,224,023

FLOOR POLISHING AND SCRUBBING MACHINES WITH LIQUID DISPENSERS

Filed April 29, 1964 2 Sheets-Sheet 1

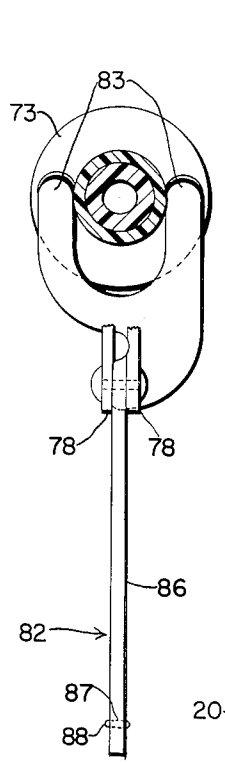


Fig. 6

Fig. 1

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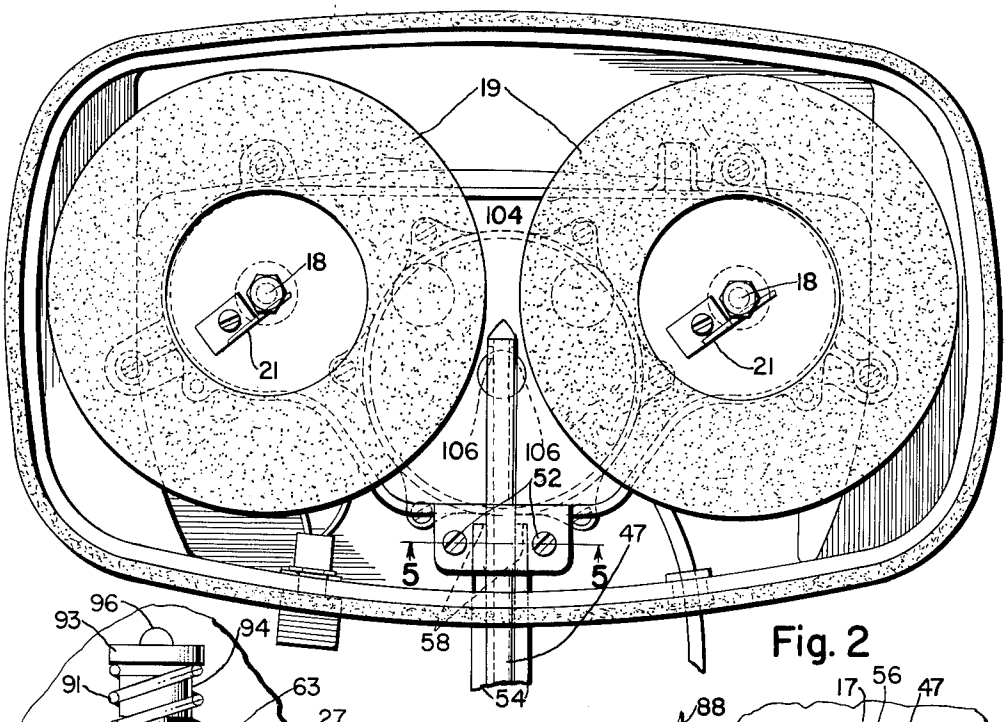


Fig. 2

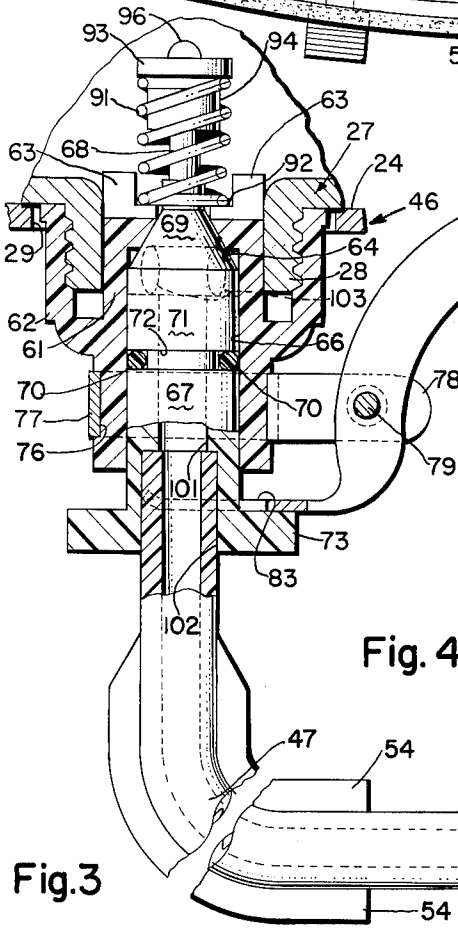


Fig. 4

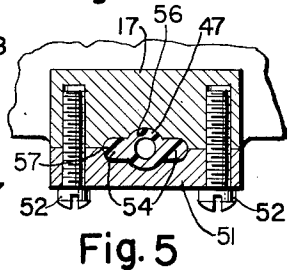


Fig. 5

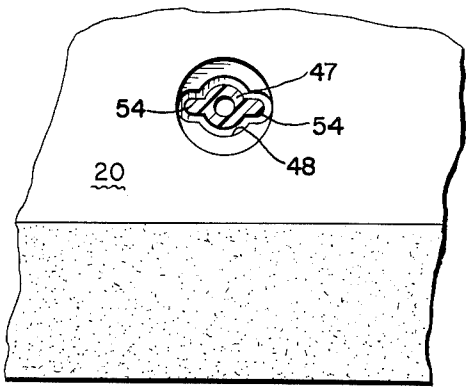


Fig.3

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FLOOR POLISHING AND SCRUBBING MACHINES WITH LIQUID DISPENSERS

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This invention relates to floor polishing and scrubbing machines and more particularly to means for dispensing a detergent or other liquid used during floor polishing or scrubbing, and the primary object of the present invention is to provide an improved device of this character.

Another object of the invention is to provide an improved and inexpensive valve for use with the liquid dispenser of floor polishing and scrubbing machines.

A further object of the invention is to provide an improved means for conducting liquid to a location between a pair of polishing or scrubbing brushes.

A still further object of the invention is to provide a liquid dispensing valve which is made mostly of plastic parts.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the drawings:

FIG. 1 is a side elevational view, partly in section, illustrating a floor polishing and scrubbing machine embodying the present invention,

FIG. 2 is a bottom plan view of the floor polishing and scrubbing machine shown in FIG. 1,

FIG. 3 is an enlarged view, partly in section, showing portions of the liquid dispenser forming part of the floor polishing and scrubbing machine shown in FIGS. 1 and 2,

FIG. 4 is a sectional view taken on the line 4—4 of FIG. 1,

FIG. 5 is a sectional view taken on the line 5—5 of FIG. 2, and

FIG. 6 is a view, partly in section, taken on the line 6—6 of FIG. 1.

FIGS. 1 through 6 of the drawings illustrate a floor polishing and scrubbing machine 16 having an upstanding combination motor and gear housing 17, the housing 17 being covered by a preferably plastic appearance-cover 20. A pair of driven shafts 18—18 extend through the bottom of the housing 17 and drive circular brushes 19—19 which are held to the shafts 18 by spring latches 21—21. A bifurcated handle support or bail 22 is pivotally connected, as at 23, to opposite sides of the housing 17 and the upper horizontal reach 24 of the bail 22 carries a ferrule (not shown) to which is attached the lower end of a handle 26. The upper surface of the reach supports the lower end of a preferably plastic liquid container 27, the lower end of the container 27 being formed with a downwardly open externally threaded nipple 28 which extends through an opening 29 in the reach 24. One side of the container 27 is formed with an identation 31 designed to receive the handle 26. The upper end of the container 27 is formed with an upwardly open externally threaded nipple 32 closed by a cap 33, and the upper end of the container 27 is held to the handle 26 by reason of the nipple 32 extending through a hole 34 formed in a flexible plastic arm 36 which extends outwardly from a collar 37 formed around the handle 26, the collar 37 being held in place by a screw 38. The collar 37 also clamps an electric extension cord

39 to the handle 26 and is formed with a cord supporting hook 41.

Detergent or other fluid is fed from the container 27 through a valve 46, thence through a hollow tube 47, the upper end of the tube 47 being connected to the valve 46 and the lower end of the tube 47 passing through an aperture 48 formed in the cover 20 and terminating at a location between the brushes 19—19. The tube 47 is clamped to the housing 17 by means of a block 51 held by screws 52 and the block 51 also pivotally supports an arm 50 for rotatably mounting a wheel 53. The external surface of the tube 47 is formed with a pair of longitudinally extending diametrically disposed ribs or flanges 54, the ribs 54—54 terminating short of the two ends of the tube 47 and thereby causing the two ends of the tube 47 to be substantially circular in form. Reference to FIG. 5 shows that the housing 17 is provided with a recess 56 complemental to one-half of the tube 47 and that the block 51 is provided with a similar recess 57 also complemental to one-half of the tube 47 and the recesses 56 and 57 terminate at 58 thereby properly positioning the tube 47 both longitudinally and turnably.

The valve 46 comprises a hollow cylindrical valve shell 61 formed integral with and partly encompassed by a cylindrically internally threaded cap 62. The cap 62 is threaded to the nipple 28 and the upper end of the shell 61 enters the hollow portion of the nipple 28 thereby permitting fluid to pass from the container 27 through the valve 46 to the tube 47. The upper end of the shell 61 is formed with a pair of upstanding part-circular lugs 63—63, below which the shell 61 is formed with a frustoconical valve seat 64. Below the seat 64 the shell 61 is formed with a cylindrical bore 66. The bore 66 and the seat 64 accommodate a valve body 67, the uppermost end of which has a cylindrical stem 68 extending above the lugs 63—63. Below the stem 68 the valve body 67 has formed integral therewith a frustoconical plug 69 which cooperates with the seat 64. Below the plug 69 the valve body 67 is cylindrical as at 71 and has an annular cut 72 for accommodating a packing ring 70 and the lowermost end of the valve body 67 has an outwardly extending circular flange 73. The lower end of the shell 61 protrudes below the cap 62 and is formed with an external annular cut 76 which accommodates a metallic band 77, opposite ends of which extend radially of the shell 61 to form arms 78—78 for supporting the pivot 79 of a lever 82. One bifurcated arm 83 of the lever 82 engages the upper surface of the flange 73. The other arm 86 of the lever 82 has a hole 87 for securing the lower end of a pull-cord 88, the upper end of which is tied to a ring 89 which may, in a conventional but unshown manner, be supported by the upper end of the handle 26. When the cord 88 is pulled upwardly the arm 83 of the lever 82 depresses the valve body 67 against the compression of a spiral compression spring 91 which surrounds the stem 68 of the valve body 67. The lower end of the spring rests on a seat 92 formed on the upper end of the shell 61 and the upper end of the spring 91 is engaged by the lower surface of a flange 93 formed on the upper end of a sleeve 94 carried on the stem 68. The sleeve 94 is maintained on the stem 68 by a head 96 formed on the upper end of the stem 68 by applying a hot iron to the upper end of the stem 68 and thereby causing the material of the stem 68 to flow sufficiently to form the head 96.

The valve body 67 has a centrally located bore 101 which at its lower end is enlarged, as at 102, to accommodate the upper substantially circular end of the tube 47, the tube 47 being held in the enlargement 102 by a suitable adhesive. The upper end of the bore 101 terminates in a pair of radially extending inlet ports 103 and 103. The lower end of the tube 47 is closed by the

process of heat sealing, as indicated at 104, and immediately above the seal 104 the tube 47 has a pair of transversely extending outlet ports 106—106. It should be noted that the ports 106—106 extend in the same plane as the ribs 54—54 and therefore since the ribs 54—54 are clamped so as to extend from side to side (not front to back) of the floor polisher 16, by the aperture 48 and the block 51, the ports 106—106 will dispense liquid toward the left and right brushes 19—19.

In operation the subject floor polishing and scrubbing machine 16 functions in the following manner. When the operator desires to dispense a detergent or other liquid to the brushes 19—19 she removes the cap 33 and fills the container 27 through the nipple 32. Then, by use of the ring 89, she pulls on the cord 88 which causes the lever 82 to turn counterclockwise (FIGS. 1 and 3) about the pivot 79. This causes the bifurcated arm 83 to press on the flange 73 thereby moving the valve body 67 downwardly against the upward pressure of the spring 91. As the valve body 67 moves downwardly, the frustoconical plug 69 is separated from the valve seat 64. This permits liquid to pass from the container 27 to the upper end of the bore 66, and through the inlet ports 103—103 into the bore 101 and thence through the hollow tube 47 and through the outlet ports 106—106 toward the brushes 19—19. As soon as sufficient liquid has been dispersed, the operator releases the cord 88 and the spring 91 returns the valve body 67 to the position wherein the frustoconical plug 69 engages the seat 64, thereby stopping the flow of liquid. The operator then starts the motor (not shown) and drives the brushes 19—19 in a known manner.

It will be appreciated that it is necessary that the ports 106 direct the liquid sidewise or, in other words, laterally toward the rotating brushes 19. The ribs or flanges 54 on the tube 47 cooperate with the aperture 48 shaped complemental to the flanged portion of the tube 47 in the appearance cover 20 and are clamped into the complemental shaped recesses 56 and 57 respectively, formed in the gear housing 17 and in the block 51. Also the tube 47 is positioned lengthwise by the ends of the flange 54 abutting the terminals 58 of the recesses 56 and 57. This permits the tube 47 to be quickly inserted through the cover 20 and secured to the housing 17 with ports 106 always being disposed to direct the liquid toward the rotating brushes and at the proper position, front to rear, of the floor polishing and scrubbing machine 16.

Having thus described the invention, what I claim herein is:

1. A floor polishing and scrubbing machine comprising a housing having a recess formed to accommodate a cylindrical tube having oppositely disposed ribs, an appearance cover surrounding said housing, a pair of vertical axis brushes rotatably mounted on the lower end of said housing, a handle pivotally mounted on said housing, a liquid container carried by said handle, a valve connected to said container, a tube having a first end connected to said valve and having a second end closed except for a pair of transversely extending outlet ports, said second end being positioned between said pair of brushes, a pair of ribs formed on opposite sides of the external surface of said tube, a block having a recess, said last named recess being complemental to the recess in said housing, means clamping said block and thereby clamping said tube and said ribs to said housing, the complemental recesses in said housing and in said block holding said tube and the outlet ports thereof in a position to direct the flow of liquid from said outlet ports in directions sidewise of said polishing and scrubbing machine and laterally toward said rotating brushes.

2. A floor polishing and scrubbing machine comprising a housing, a vertical axis brush rotatably mounted on the lower end of said housing, a handle pivotally mounted on said housing, a plastic liquid container carried by said handle, an externally threaded plastic nipple depending from said container, a hollow plastic valve shell having a portion entering said nipple and having an internally threaded plastic cap surrounding said valve shell and threaded to said nipple, a frustoconical valve seat formed internally of said valve shell, a plastic valve body slidably carried within said valve shell, a frustoconical plastic plug formed on said valve body for engaging said valve seat, a spring causing said plug to engage said valve seat, a tube extending from said valve shell to said brush, and means for compressing said spring and separating said plug from said valve seat to thereby permit liquid to flow from said container, through said valve shell, and through said tube to a location adjacent to said brush.

3. A floor polishing and scrubbing machine comprising a housing, a vertical axis brush rotatably mounted on the lower end of said housing, a handle pivotally mounted on said housing, a liquid container carried by said handle, an externally threaded nipple depending from said container, a hollow valve shell having a portion entering said nipple and having an internally threaded cap surrounding said shell and threaded to said nipple, a frustoconical valve seat formed internally of said shell, a valve body slidably carried within said shell, a frustoconical plug formed on said valve body for engaging said valve seat, a stem formed on said valve body, a flanged sleeve carried on said stem, a head formed on said stem for holding said sleeve on said stem, a helical compression spring surrounding said stem and engaging said flanged sleeve and said shell to cause said plug to engage said valve seat, a tube extending from said valve shell to said brush, and means for compressing said spring and separating said plug from said valve seat to thereby permit liquid to flow from said container, through said valve, and through said tube to a location adjacent to said brush.

4. A floor polishing and scrubbing machine comprising a housing, an appearance cover surrounding said housing, a vertical axis brush rotatably mounted on the lower end of said housing, a handle pivotally mounted on said housing, a liquid container carried by said handle, an externally threaded nipple depending from said container, a hollow valve shell having a portion entering said nipple and having an internally threaded cap surrounding said valve shell and threaded to said nipple, a frustoconical valve seat formed internally of said valve shell, a valve body slidably carried within said valve shell, a frustoconical plug formed on said valve body for engaging said valve seat, a stem formed on said valve body, a flanged sleeve carried on said stem, a head formed on said stem for holding said sleeve on said stem, a helical compression spring surrounding said stem and engaging said flanged sleeve and said valve shell to cause said plug to engage said valve seat, a tube extending from said valve shell to said brush, a flange formed on said valve body, and a lever pivotally carried on said valve shell, said lever having a bifurcated arm engaging the flange on said valve body for compressing said spring and separating said plug from said valve seat to thereby permit liquid to flow from said container, through said valve shell, and through said tube to a location adjacent to said brush.

5. A floor polishing and scrubbing machine comprising a housing, an appearance cover surrounding said housing, a vertical axis brush rotatably mounted on the lower end of said housing, a handle pivotally mounted on said housing, a liquid container carried by said handle, an externally threaded nipple depending from said container, a hollow valve shell having a portion entering said nipple and having an internally threaded cap surrounding said valve shell and threaded to said nipple, a frustoconical valve seat formed internally of said valve shell, a valve body slidably carried within said valve shell, a frustoconical plug formed on said valve body for engaging said valve seat, a stem formed on said valve body,

a flanged sleeve carried on said stem, a head formed on said stem for holding said sleeve on said stem, a helical compression spring surrounding said stem and engaging said flanged sleeve and said valve shell to cause said plug to engage said valve seat, a tube having one end connected to said valve shell and having its other end closed except for a pair of transversely extending outlet ports, a pair of ribs formed on opposite sides of the external surface of said tube, a block clamping said tube and said ribs to said housing, the relationship between said block, said ribs and said outlet port being such as to direct the flow of liquid from said outlet ports in directions sidewise of said polishing and scrubbing machine, and means for moving said frustoconical plug away from said frustoconical valve seat against the bias of said compression spring to thereby permit liquid to

flow from said container through said valve shell and through said tube.

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