May 19, 1970 D. B. SPENCER 3,512,208

ADJUSTMENT MEANS FOR TOOL BRUSH IN VACUUM CLEANER

Filed April 1, 1968 2 Sheets-Sheet 1

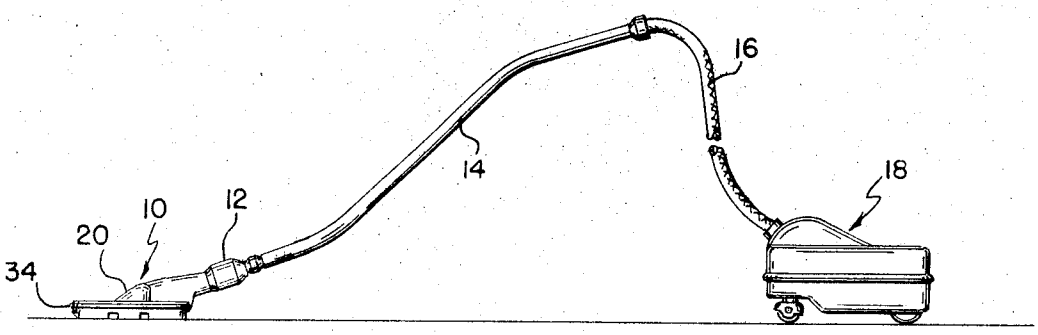


FIG.1

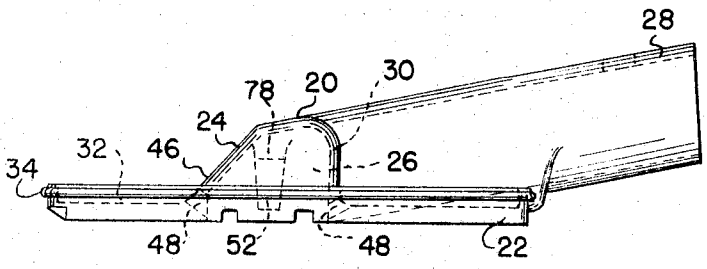


FIG.2

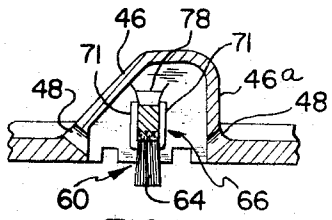


FIG.3

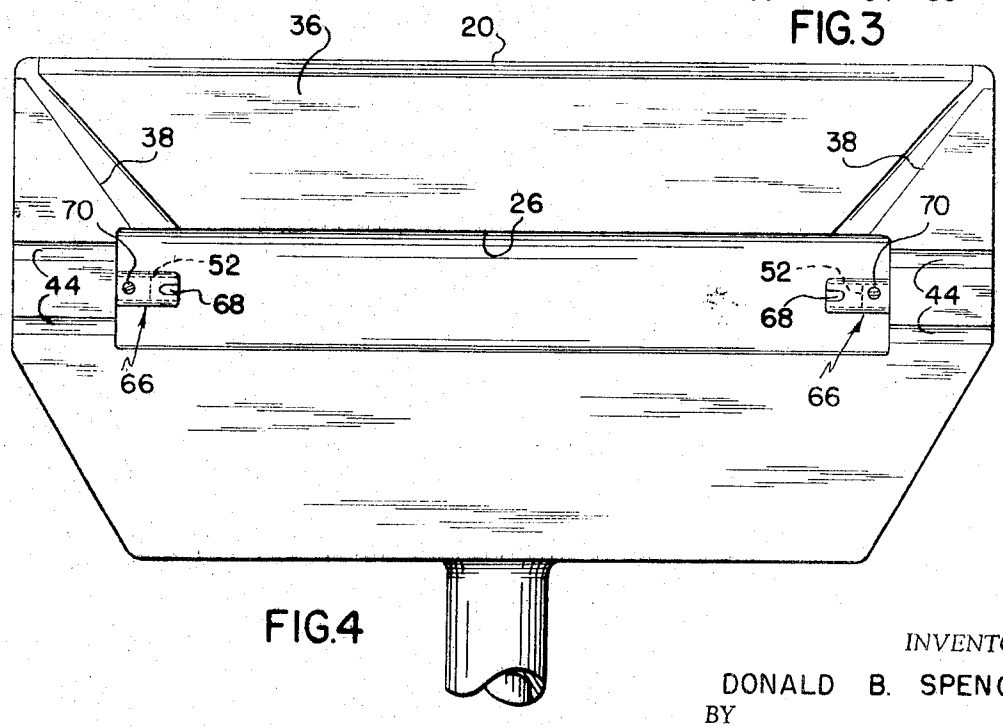


FIG.4

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ADJUSTMENT MEANS FOR TOOL BRUSH IN VACUUM CLEANER

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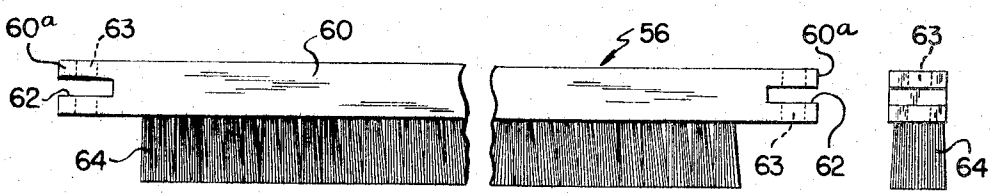


FIG.5

FIG.6

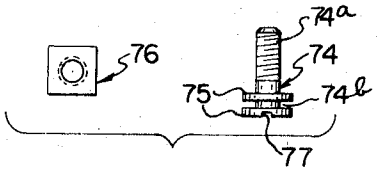
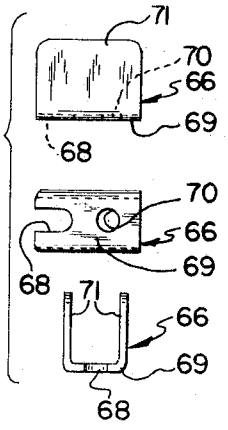


FIG.8

FIG.7



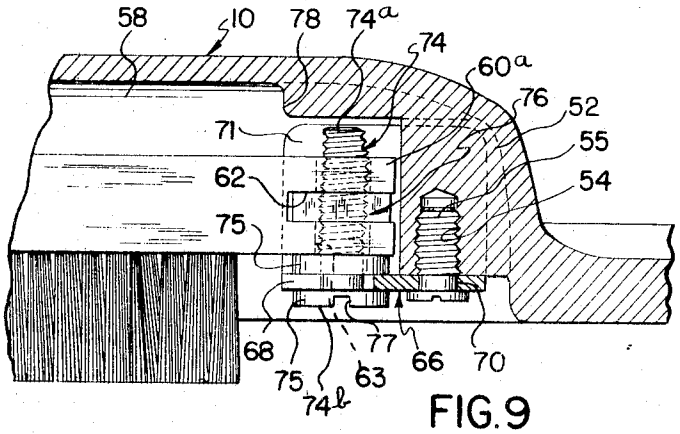


FIG.9

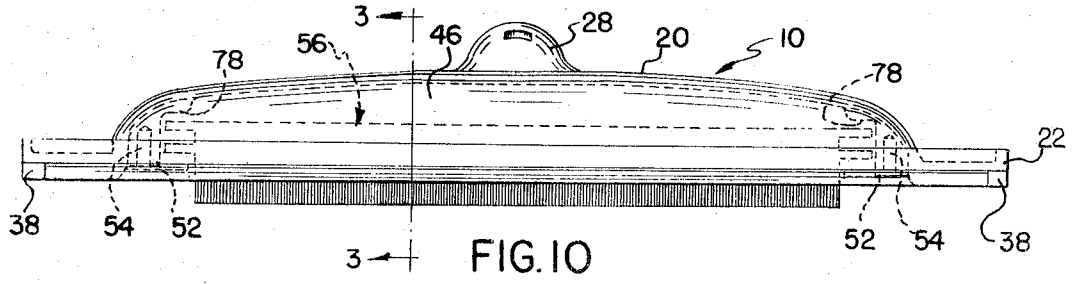


FIG.10

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ADJUSTMENT MEANS FOR TOOL BRUSH IN VACUUM CLEANER

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U.S. Cl. 15—368 8 Claims

ABSTRACT OF THE DISCLOSURE

A cleaning tool with an adjustable brush, adapted for use with a vacuum cleaner such as a canister-type vacuum cleaner, comprising a housing adapted for connection to an operating handle. The housing comprises a suction chamber with the brush generally centrally mounted in the suction chamber and extending transversely thereof. A clip-like support member of generally U-shaped configuration is mounted at each end of the suction chamber and mounts rotatable screw-like means thereon which threadedly engage nuts on the brush and adjustably mount the brush in the chamber, providing for selectively raising and lowering the brush with respect to the housing upon rotation of the screw-like means.

This invention relates in general to a cleaning tool for use with a vacuum cleaner and more particularly relates to a cleaning tool having a brush movably mounted therein adapted for engagement with the surface, such as a rug, to be cleaned, together with means adjustably mounting the brush on the cleaning tool for selectively positioning the brush on the tool, in a vertical direction.

Cleaning tools for vacuum cleaners having adjustably mounted brush structures associated therewith are known in the art. However, such prior art arrangements for adjustably mounting a brush on a vacuum cleaning tool are generally relatively complex and oftentimes unduly expensive.

The present invention provides a novel, simplified mechanism for adjustably mounting a brush in a cleaning tool, for selectively varying the extent of projection of the bristles of the brush from the underside of the tool.

Accordingly, an object of the invention is to provide a novel cleaning tool for use with a source of suction such as, for instance, a canister-type vacuum cleaner, and which has an adjustably mounted brush mechanism thereon.

Another object of the invention is to provide a cleaning tool which defines a suction chamber opening on the underside of the tool and wherein a bristle brush comprising an elongated body portion and bristles extending downwardly from the body portion is generally centrally mounted in the suction chamber and extends transversely of the tool for engagment with the surface to be cleaned, and wherein a novel arrangement of clip means is mounted on opposite ends of the suction chamber and supports upwardly projecting screw-like means on the clip means with the screw-like means coacting with means on the brush for raising and lowering the brush with respect to the housing upon rotation of the screw-like means.

A still further object of the invention is to provide a novel and simplified arrangement for adjustably mounting a cleaning brush on a cleaning tool of the type adapted for coupling to a canister-type vacuum cleaner.

A still further object of the invention is to provide a novel clip means for adjustably mounting a brush of a cleaning tool in the tool, and wherein the clip means comprise a pair of generally U-shaped clips having an elongated slot in the base portion of the U configuration with the slot adapted to receive therein a spaced abutment head portion of a threaded screw which coacts with threaded means on the brush body for moving the brush vertically with respect to the tool housing upon rotation of the screw on the clip.

Other objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a diagrammatic illustration of a cleaning tool embodying the invention as coupled to an operating handle or wand, which in turn is attached by means of a flexible hose to a canister-type vacuum cleaner;

FIG. 2 is an enlarged side-elevational view of the cleaning tool of FIG. 1 with the brush removed;

FIG. 3 is a sectional view taken generally along the plane of line 3—3 of FIG. 10 looking in the direction of the arrows;

FIG. 4 is a bottom-plan view of the cleaning tool housing and illustrating the support clips mounted on lugs at opposite ends of the housing suction chamber, and which mount the rotatable brush adjusting screw means on the housing. The brush has been deleted from the FIG. 4 showing;

FIG. 5 is a front-elevational view of the brush of the cleaning tool;

FIG. 6 is an end-elevational view of the brush of FIG. 5;

FIG. 7 shows respectively side elevational, bottom and end elevational views of one of the support clips for mounting the rotatable screw adjusting means and the brush in the suction chamber of the tool housing;

FIG. 8 shows illustrations of respectively the adjusting nut and adjusting screw or bolt, adapted for assembly with the brush of FIGS. 5 and 6 and the clips of FIG. 7, for adjustably mounting the brush in the cleaning tool;

FIG. 9 is an enlarged, fragmentary, sectioned view showing the adjustable mounting of the brush at one end of the suction chamber of the cleaning tool;

FIG. 10 is a front-elevational view of the cleaning tool of the invention.

Referring now again to the drawings, there is disclosed in the preferred embodiment of the invention, a cleaning tool **10** attached as by means of a releasable coupling **12** to a wand **14** which, in turn, is attached to a flexible hose **16** coupled to a source of vacuum such as a canister-type vacuum cleaner **18**.

The cleaning tool **10** comprises a housing **20** which may be formed of any suitable material, such as for instance, light-weight aluminum, and which includes in the embodiment illustrated, a generally polygonal-shaped, substantially flat body portion **22** and elongated crown portion **24** extending upwardly from the body portion **22** and defining a suction chamber **26**. A tubular-like exit portion **28** extends rearwardly from the crowned portion **24**, and communicates with suction chamber **26** at an outlet opening **30**. The body portion **22** perferably has

an upstanding peripheral flange **32** receiving thereon in snug, frictionally mounting relation, a bumper **34** formed of resilient material such as rubber, to protect surfaces engaged by the cleaning tool during movement of the latter over a surface being cleaned.

As may be best seen in FIG. 4, the bottom surface **36** of the tool may be generally planar, with the suction chamber **26** opening onto such bottom surface. Diagonally extending passageways **38** may be formed in such bottom surface and extend from communication with the suction chamber **26** diagonally outwardly to terminate at the respective forward corners of the tool housing. Passages **44** may also be provided in the bottom surface of the tool, which passages communicate with the suction chamber **26** and at their outer ends open onto the exterior perimeter of the housing, for providing suction action from the suction chamber at the side edges of the tool. Passages **38, 44** facilitate cleaning or difficult access areas, such as corners and edges along walls and the like, by the tool, thus increasing the cleaning efficiency of the tool.

The aforementioned crowned portion **24** may comprise a generally diagonally-sloping front wall **46** and a back wall **46*a***, with the front wall **46** and back wall **46*a*** being connected by an upper wall section and end wall sections, and with the front, back and end wall sections merging at their lower ends with generally planar body portion **22** of the tool housing.

Along the juncture of the front and rear walls of the crowned portion with the body portion of the tool housing, there may be provided a plurality of spaced jet orifices **48** which extend from the exterior of the housing diagonally inwardly as best seen in FIG. 3, to communicate adjacent their inner ends with the suction chamber **26** adjacent the bottom of the suction chamber. Orifices **48** create jet streams of inlet air which are adapted to impinge against the surface being cleaned, such as the nap of a carpet, to scrub the carpet fibers with the streams of air and cause upward "boiling" of debris material from the carpet, prior to movement of the intake air through the outlet opening **30** from the suction chamber. The inlet air may then pass out the exit portion **28** to the wand **14**, and thence to the vacuum cleaner **18** via the hose **16**. The jet orifices on opposite sides of the crowned portion are preferably disposed in generally opposing relationship with one another so that the jet streams of inlet air are directed to both sides of the suction chamber at the same general vicinity downwardly against the surface being cleaned. This aids in "boiling" the debris upwardly out of the carpet and also aids in maintaining the mobility of the tool as the latter is moved across the floor in a skilike effect without undue drag on the tool due to the suction. The passages **44, 38** formed on the underside of the tool head coact with the jet orifices **48** for completely cleaning the surface engaged by the tool and enabling an effective cleaning operation to occur as the intake air is sucked through the air passages **44, 38** and jet orifices **48**, into the suction chamber **26**.

Lugs **52** (FIGS. 9 and 10) may be formed on both ends of the suction chamber with such lugs being disposed in spaced relation to the front and rear walls **46, 46*a*** defining the suction chamber (FIG. 4). As can be best seen in FIGS. 9 and 10, each lug may have an opening **54** therein for receiving a fastening member such as screw **55**, for a purpose to be hereinafter described. A brush member **56** is provided which is adapted for mounting generally centrally in the suction chamber and between lugs **52**. The brush member is adapted to engage the surface being cleaned, such as a rug, and to loosen debris which may be disposed in the rug nap. In this connection, since the jet orifice means **48** directs jet streams of air downwardly towards the plane of both sides of the brush, the latter is effective in both the forward and rearward movement of the cleaning tool for removing debris from a rug. As can be best seen in FIGS. **9** and **10**, there is space as at **58** above the brush in the such chamber, for permitting the movement of the incoming air and debris "boiled" out of the rug on the front side of the brush to move upwardly and above the brush and then out exit opening **30** from the suction chamber.

The brush **56** may include an elongated body or mounting portion **60** of rectangular cross sectional configuration (in the embodiment illustrated) and having bifurcated ends **60*a*** defining recesses **62** for a purpose to be hereinafter described. Each end **60*a*** has a generally vertical opening **63** extending therethrough. Flexible bristles **64** extend outwardly or downwardly from the mounting portion **60** and are adapted to engage the surface to be cleaned. In order to adjustably mount the brush in the suction chamber for varying the amount that the bristles **64** project downwardly from the underside of the tool, there are provided brush supporting members **66** at each end of the suction chamber projecting into the latter (FIG. 9). As can be best seen in FIG. 7, members **66** are of generally U-shaped clip configuration in end elevation and have an elongated slot **68** in the connecting or base portion **69** of the clip, extending inwardly from one end thereof. An opening **70** is also provided in the base portion of the clip in spaced relation to the slot **68**, with said opening being adapted to receive therethrough the aforementioned fastener **55** which extends into opening **54** in the bottom of lug **52** in the suction chamber thus mounting or securing the clip to the lug **52**. It will be seen that the arm portions **71** of the U-shaped clip encompass the sides of the associated lug and securely mount the clip on the lug.

A screw-like member **74** (FIGS. 8 and 9) having a threaded shank portion **74*a*** and a head portion **74*b*** is adapted to be received in the slotted portion **68** of the respective clip, with head portion **74*b*** comprising spaced abutments **75** disposed on opposite sides of the base portion **69** of the clip member, and with the threaded shank **74*a*** of the screw-like member extending upwardly through opening **63** in the associated end of the brush. Shank **74*a*** is adapted to engage in threaded coaction with a nut **76** received in the recess **62** in the bifurcated portion of the respective end of the brush, as best shown in FIG. 9, to mount the brush in predetermined position in the suction chamber of the cleaning tool. The threaded coaction between the threaded shank **74*a*** and the nut **76** is preferably such that there is slight frictional resistance to rotation of the screw-like member **74** so that the latter will not inadvertently rotate with respect to the nut unless it is turned as by means of a screwdriver inserted into the slot **77** of member **74**. It will be readily seen that by rotating the member **74** on each end of the housing, the brush will be raised or lowered with respect to the tool housing, to thereby vary the extent of projection of the bristles **64** of the brush downwardly from the underside of the tool. Abutment boss **78** (FIGS. 9 and 10) formed on the interior of the top wall at each end of the suction chamber and overlying the associated end of the brush, limit the upward movement of the latter to maintain space **58** above the brush. As the brush bristles wear, the brush can be lowered to expose more of the bristles from the underside of the tool. The defining end surfaces of the recesses **62** in the brush body ends may coact with the respective polygonal-shaped nut to prevent turning of the nut with respect to the body portion. Also the arm portions **71** of the clips which encompass the ends of the brush may guide and stabilize the brush in the suction chamber.

The brush can be readily replaced when major wearing of the bristles occurs by merely loosening the threaded fasteners **55** and removing each clip from its respective end of the housing, and then reassembling with a new brush. It will be seen that in the embodiment illustrated, the rotatable threaded members **74** pass through the openings **63** in the ends of the body portion **60** of the brush in non-interfering relationship so that the only resistance to turning of the rotatable members is the coaction of the latter with the nuts **76**.

From the foregoing description and accompanying drawings, it will be seen that there is provided a cleaning tool for use with a vacuum cleaner and wherein the tool includes a suction chamber therein having a brush mounted in the suction chamber, with simplified means for readily adjusting the amount of projection of the bristles of the brush outwardly of the underside of the tool, and an adjusting mechanism that is easily operated and which effectively mounts the brush in adjustable relation in the cleaning tool.

The terms and expressions which have been used are used as terms of description and not of limitation and there is no intention in the use of such terms and expressions of excluding any equivalents of any of the features shown or described or portions thereof and it is recognized that various modifications are possible within the scope of the invention claimed.

I claim:

1. A cleaning tool for use with a suction-type cleaner adapted for use in the cleaning of rugs and the like comprising, a housing, a transversely extending suction chamber in said housing, outlet means communicating with said suction chamber, said outlet means being adapted for connection to a vacuum source, brush means mounted in said chamber and extending downwardly therefrom for engagement with the surface to be cleaned, said housing including lugs formed adjacent each end of said chamber, and means for selectively adjusting the vertical position of said brush means in said chamber, the last mentioned adjusting means comprising a support member at each end of said chamber coacting with a respective one of said lugs and rotatable means mounted on said support members and coacting with means on said brush means for moving the brush means vertically in said chamber upon rotation of said rotatable means, each of said lugs having means for securing the associated support member thereto, each of said support members projecting into said chamber and having slot-like means therein rotatably mounting said rotatable means, said rotatable means being threaded and coacting in threaded relation with threaded means on said brush means for moving the brush means vertically with respect to the rotatable means upon rotation of the rotatable means with respect to the respective support member.

2. A cleaning tool for use with a suction type cleaner adapted for use in the cleaning of rugs and the like comprising a housing, a suction chamber in said housing, outlet means communicating with said suction chamber, said outlet means being adapted for connection to a vacuum source, brush means mounted in said chamber and extending downwardly therefrom for engagement with the surface to be cleaned, and means for selectively adjusting the vertical position of said brush means in said chamber, the last mentioned adjusting means comprising supports at each end of said chamber and rotatable means mounted on said supports coacting with said brush means for moving said brush means vertically in said chamber upon rotation of said rotatable means and wherein each of said supports comprises a clip member of generally U-shape configuration in end elevation projecting into said chamber, each clip member having a slot therein rotatably mounting said rotatable means, said rotatable means being threaded and coacting in threaded engagement with threaded means on the corresponding end of said brush means for moving the brush means vertically with respect to the rotatable means upon rotation of the rotatable means.

3. A tool in accordance with claim **2** wherein said housing includes a mounting lug on each end of said chamber, said clip members embracing the respective of said lugs and being secured thereto, said slot in each clip member being disposed inwardly of the associated lug and mounting the associated rotatable means inwardly of the associated lug.

4. A tool in accordance with claim **2** wherein said chamber is defined by a crowned portion of the housing disposed generally centrally with respect to the remainder of said housing and projecting upwardly therefrom, said brush means being disposed generally centrally of said suction chamber and extending thereacross, said brush means comprising an elongated body portion and a bristle portion extending downwardly from said body portion, and lugs formed on opposite ends of said suction chamber, said clip members extending inwardly from said lugs, each of said clip members being secured to a respective of said lugs.

5. A cleaning tool for use with a suction type cleaner adapted for use in the cleaning of rugs and the like comprising, a housing, a suction chamber in said housing, outlet means communicating with said suction chamber, said outlet means being adapted for connection to a vacuum source, brush means mounted in said chamber and extending downwardly therefrom for engagement with the surface to be cleaned, and means for selectively adjusting the vertical position of said brush means in said chamber, the last mentioned adjusting means comprising supports at each end of said chamber and rotatable means mounted on said supports coacting with said brush means for moving said brush means vertically in said chamber upon rotation of said rotatable means, and wherein said brush means comprises an elongated body portion having bifurcated ends, generally vertical openings extending through said bifurcated ends, said openings receiving said rotatable means therethrough is non-interfacing relation, and each of said bifurcated ends mounting threaded means, such as a nut, therein in non-rotatable relation, said threaded means coacting in threded relation with said rotatable means whereby upon rotation of the latter, said brush means and associated threaded means are moved vertically in said chamber.

6. A cleaning tool for use with a suction-type cleaner adapted for use in the cleaning of rugs and the like comprising, a housing, a suction chamber in said housing, outlet means communicating with said suction chamber, said outlet means being adapted for connection to a vacuum source, brush means mounted in said chamber and extending downwardly therefrom for engagement with the surface to be cleaned, and means for selectively adjusting the vertical position of said brush means in said chamber, the last mentioned adjusting means comprising supports at each end of said chamber, and rotatable means mounted on said supports coacting with said brush means for moving the brush means vertically in said chamber upon rotation of said rotatable means, and wherein said housing includes a mounting lug on each of said chamber, said supports each comprises a generally U-shaped clip in end elevation, said clip being secured to a respective of said lugs and extending into said chamber, said clip having an elongated slot extending from one end of the base portion thereof, said rotatable member comprising a bolt having a threaded shank portion and a head portion comprising spaced abutments with the head portion being received in said slot with the abutments disposed on opposite sides of said slot for rotatably mounting the bolt on said support, and said brush means comprising threaded means thereon coacting with said threaded shank portion of said bolt for moving the brush means vertically in said chamber upon rotation of said bolt.

7. A cleaning tool in accordance with claim **6** wherein said clip includes means thereon receiving fastening means securing the clip to the respective lug, the last-mentioned means being disposed outwardly of said slot.

8. An adjusting mechanism for adjustably mounting an elongated brush in the suction chamber of a cleaning tool, said adjusting mechanism comprising support means adapted for securement to the tool for mounting the brush in the suction chamber of the tool, means on the support means for rotatably mounting a rotatable adjusting member, said adjusting member being adapted for threaded coaction with nut means on the brush for supporting the

brush and moving the brush vertically in the suction chamber upon rotary movement of the adjusting member. and wherein said support means comprises a pair of generally U-shaped in end elevation clips, each of said clips having a slot in the base portion thereof opening onto one end thereof and providing said means for rotatably mounting a respective adjusting member on the clip, and said adjusting member being screw-like having a threaded shank portion and a head portion, said head portion comprising spaced abutments thereon adapted to be received in opposite sides of said slot for rotatably mounting the threaded adjusting member on the clip, said shank portion being adapted for threaded coaction with said nut means on the brush for moving the brush vertically upon rotation of the adjusting member.

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