

July 2, 1940.

C. A. BROCK ET AL

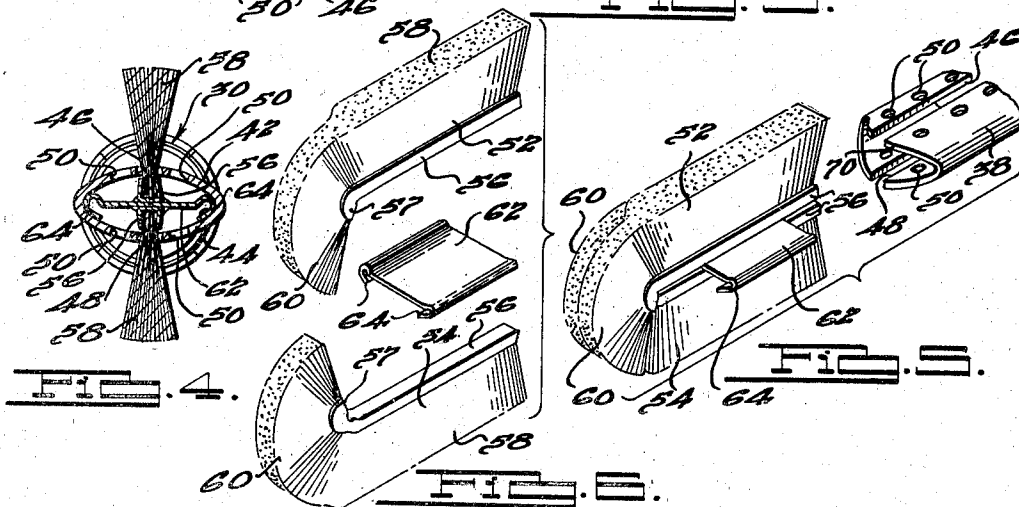
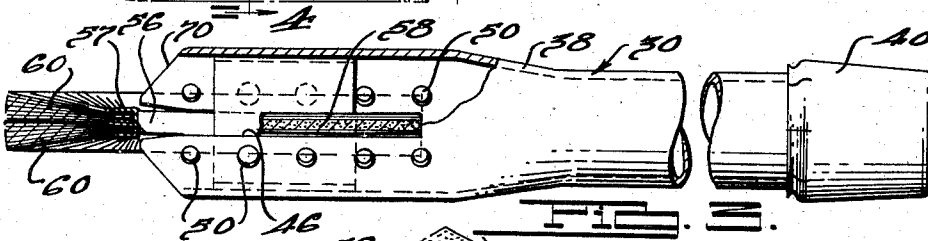
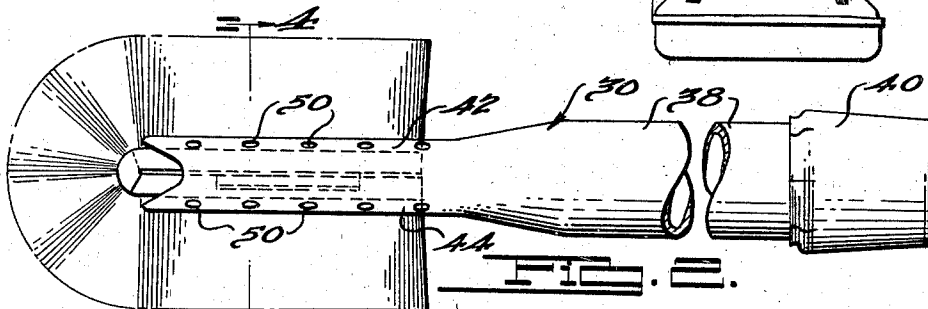
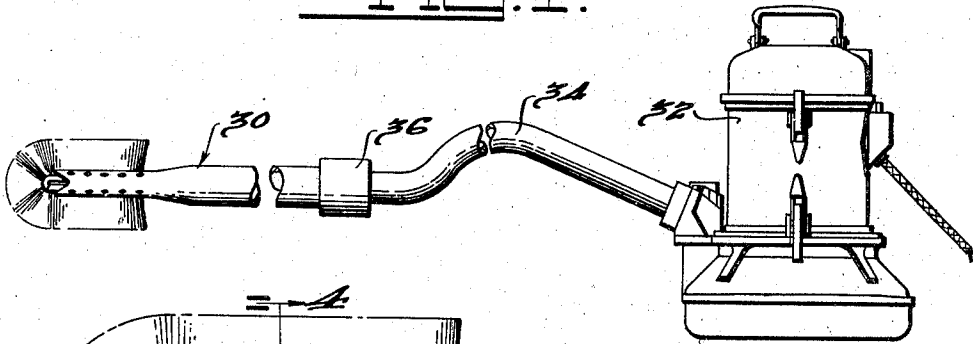
2,206,738

DUSTING TOOL FOR USE WITH VACUUM CLEANERS

Filed Nov. 18, 1938

3 Sheets-Sheet 1

FIG. 1.



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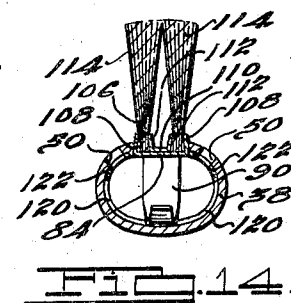
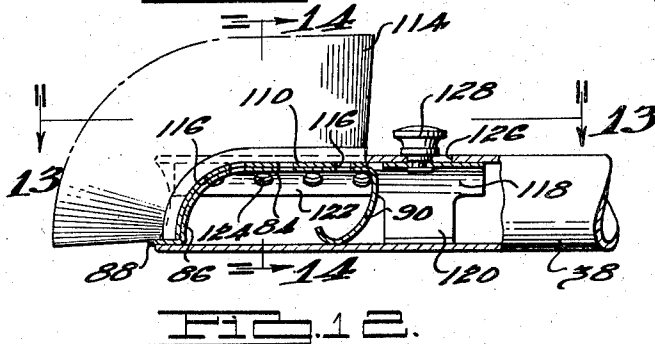
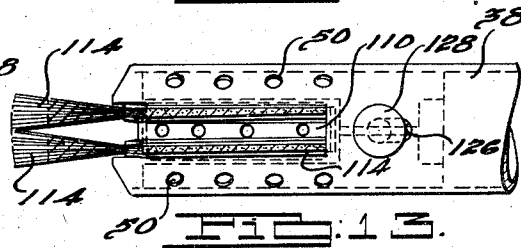
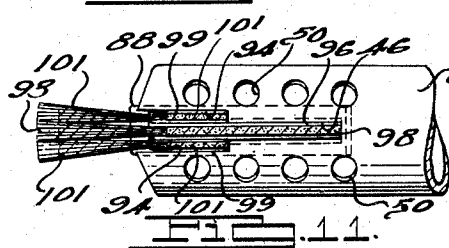
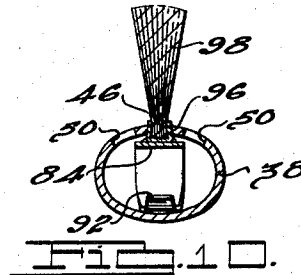
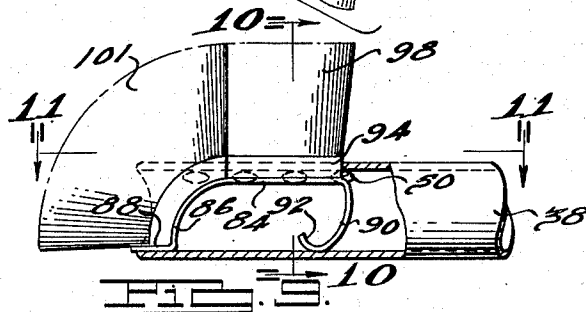
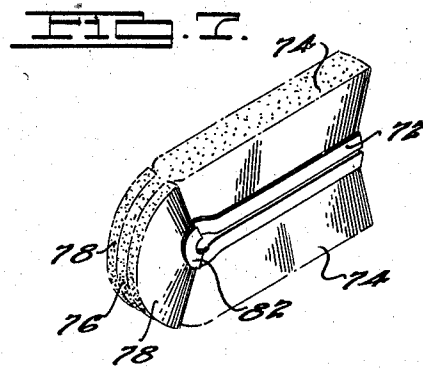
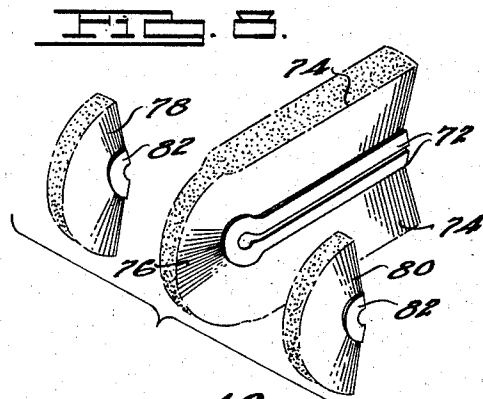
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3 Sheets-Sheet 2



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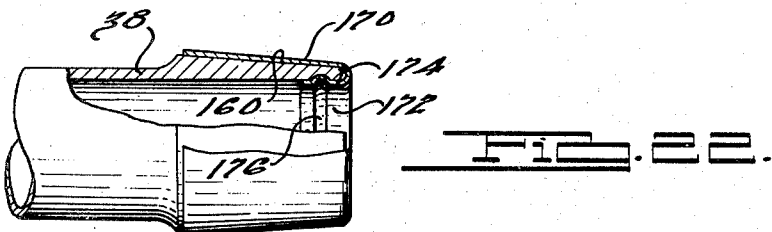
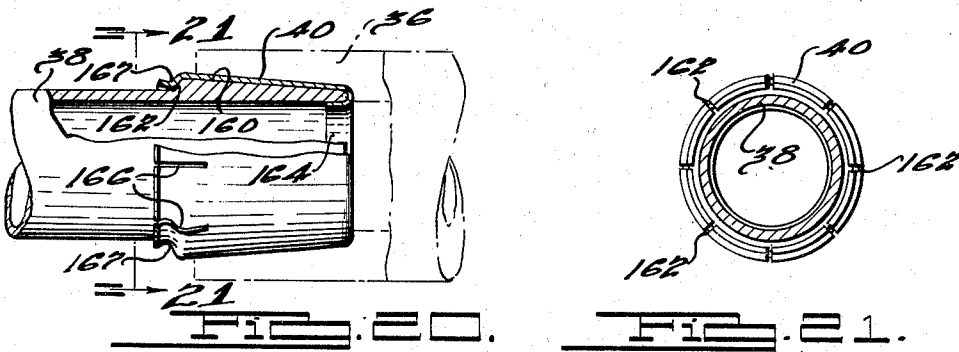
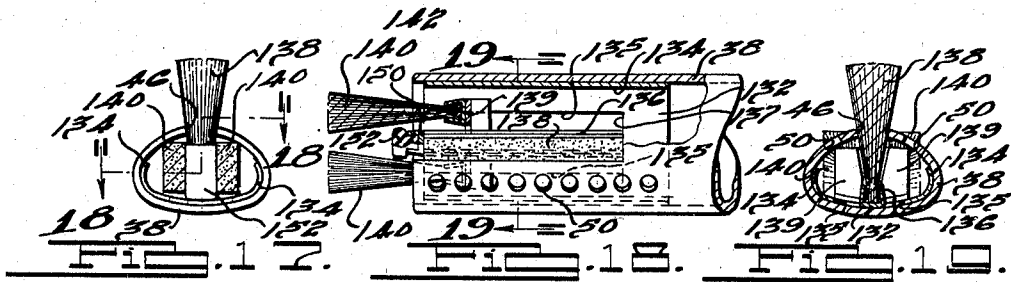
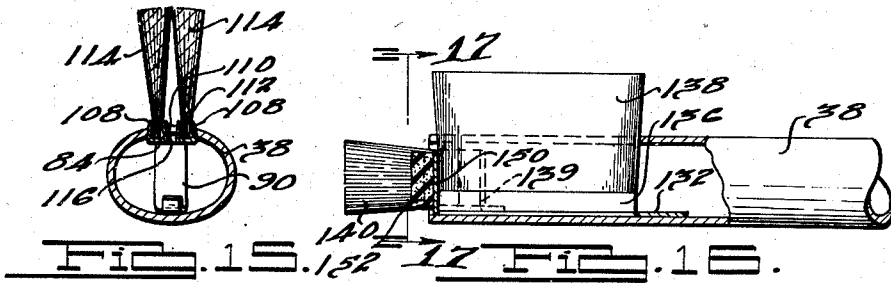
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DUSTING TOOL FOR USE WITH VACUUM CLEANERS

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,206,738

DUSTING TOOL FOR USE WITH VACUUM
CLEANERS

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Application November 18, 1938, Serial No. 241,082

7 Claims. (Cl. 15-158)

This invention relates to vacuum cleaner attachments and particularly relates to dusting tools for vacuum cleaners which loosen and remove dust and dirt from ordinarily inaccessible places.

One of the primary objects of the present invention is to provide improved brush constructions of the type mentioned which have bristles on the side and front thereof and suction intake openings adjacent the bristles so that dust may be loosened and removed from inaccessible places.

Another object of the invention is to provide improved brush constructions in which the bristles extend around an arch and in which the brushes are of uniform bristle thickness or density throughout.

Another object of the invention is to provide improved and simplified ferrule constructions on brush attachments for securing the attachment to the intake line of a vacuum cleaner.

Another object of the invention is to provide an improved brush construction of the type mentioned in which the air drawn into the attachment may be adjustably controlled.

Another object of the invention is to provide improved brush constructions which are simple and economical to manufacture.

Other objects of the invention will become apparent from the following specification, the drawings relating thereto, and from the claims hereinafter set forth.

In the drawings, in which like numerals are used to designate like parts in the several views throughout:

Figure 1 is a broken, side elevational view of a vacuum cleaner having an attachment according to the present invention, shown on an enlarged scale, associated therewith;

Fig. 2 is an enlarged, broken, side elevational view of the brush construction illustrated in Fig. 1;

Fig. 3 is a top plan view with parts broken away showing parts in cross-section of the structure illustrated in Fig. 2;

Fig. 4 is a cross-sectional view taken substantially along the line 4-4 of Fig. 2;

Fig. 5 is an exploded, perspective view of the brush unit removed from the forward end of the tool body;

Fig. 6 is an exploded, perspective view of the brush unit illustrated in Fig. 5;

Fig. 7 is a perspective view of a modified form of brush unit;

Fig. 8 is an exploded, perspective view of the brush unit shown in Fig. 7;

Fig. 9 is a fragmentary, side elevational view with parts removed showing parts in cross-section of a modified form of brush attachment;

Fig. 10 is a cross-sectional view taken substantially along the line 10-10 of Fig. 9;

Fig. 11 is a top plan view with parts in cross-section, taken substantially along the line 11-11 of Fig. 9;

Fig. 12 is a view similar to Fig. 9 illustrating the modified form of the present invention in which the amount of air taken into the tool may be adjustably controlled;

Fig. 13 is a top plan view with parts in cross-section taken substantially along the line 13-13 of Fig. 12;

Fig. 14 is a cross-sectional view taken substantially along the line 14-14 of Fig. 12;

Fig. 15 is a view similar to Fig. 14, illustrating a modified form of brush construction;

Fig. 16 is a side elevational view with parts broken away showing parts in cross-section of a modified form of brush construction;

Fig. 17 is an end elevational view showing parts in cross-section taken substantially along the line 17-17 of Fig. 16;

Fig. 18 is a cross-sectional view taken substantially along the line 18-18 of Fig. 17;

Fig. 19 is a cross-sectional view taken substantially along the line 19-19 of Fig. 18;

Fig. 20 is a fragmentary, side elevational view with parts removed, showing parts in cross-section, showing in detail the ferrule construction of the tool illustrated in Fig. 2;

Fig. 21 is a cross-sectional view taken substantially along the line 21-21 of Fig. 20; and

Fig. 22 is a view similar to Fig. 20, showing a modified form of ferrule construction.

The tools of the present invention are designed for reaching ordinarily inaccessible places so that dust may be removed from objects within such places and removed by suction through the tube. The brushes of the present invention are designed particularly for cleaning complicated telephone control mechanisms in which wires and moving parts are located in places ordinarily difficult to reach; but it is to be understood that, while the attachments of the present invention have particular utility in connection with such uses, the brushes have other uses within the scope of the invention. It will, of course be recognized that dust collects on the multitude of small wires in mechanisms of the type mentioned and that dust also accumulates on the relatively

small moving parts present in such constructions. It is necessary that these mechanisms be kept clean so that they may function properly and the attachments of the present invention are particularly adapted for this purpose.

Referring to the drawings and referring particularly to Figs. 1 to 6 thereof, in which one embodiment of the present invention is illustrated, a suction and brushing tool is generally indicated at 30 which is adapted to be removably attached to a vacuum cleaner 32 through a flexible conduit 34 having an attaching collar 36. The vacuum cleaner 32 may be of any of the conventional types of vacuum cleaners; and in the embodiment illustrated, is shown as being of the type disclosed in United States patent to Brock No. 2,102,353, granted December 14, 1937.

The tool 30 comprises an elongated tubular member 38 having a ferrule 40 mounted in embracing relationship to one end thereof which is adapted to be telescopically received within the collar 36. The particular construction of the ferrule 40 will be described in detail hereinafter in connection with Figs. 20 and 21.

The tubular member 38 is hollow and is open at its forward end to provide a suction intake opening. The member 38 is preferably flattened slightly in portions 42 and 44 adjacent the forward end. Oppositely disposed, elongated slots 46 and 48 are provided through the member 38 adjacent the forward end thereof, and suction intake openings 50 are provided through the walls of the member 38 along the side edges of slots 46 and 48.

A brushing unit is adapted to be positioned within the tubular member 38 adjacent the forward end thereof and such unit includes a pair of complementary sections 52 and 54. Each of such sections includes a backing or bristle mounting member 56 which is channel-shaped in cross section and which is turned about an arc, indicated at 57, at the forward end thereof. The bristles forming the brush, which are preferably goat hair, are adapted to be positioned within the channel-shaped mounting members, and are suitably fixed therein. By way of illustration, the bristles are shown as being held in the channel by crimping the walls thereof together. Another way would be to fix the bristles within the channel by a sealing means such as rubber, and other ways will be apparent to those familiar with the art. The bristles are disposed longitudinally of the member 56, as indicated at 58, and also around an arch 60 adjacent the forward end thereof. When the bristles are disposed around an arch, such bristles will thin out so that the thickness or density of the bristles around the arch is less than that over the straight portion. The two sections 52 and 54 are complementary to each other in shape so that when they are assembled, the longitudinally disposed bristles 58 on the respective sections extend in opposite directions from each other, and the bristles on the arches 60 overlie each other so that the resulting brush is of substantially uniform bristle thickness or density throughout.

The sections 52 and 54 are fixed relative to each other by placing the sections in the positions indicated in Fig. 5 and suitably fixed together as by welding the mounting members 56 to opposite sides of a transversely extending mounting plate 62. The mounting member 62 has its edges 64 rolled and reversely bent so as to present curved edges which are adapted to seat within the sharp, rounded corners of the

tubular member 38 adjacent the forward end thereof. The adjoining curved sections 57 of the members 56 may also be welded together, if desired.

The elements forming the brush unit are shown in their assembled position in Fig. 5 and also in their position for insertion into the forward end of the tubular member 38. The unit is slid within the forward end of the tubular member so that the round edges 64 of the plate member 62 engage the inner walls of the member 38 in the corners, as shown in Fig. 4, with the longitudinally disposed bristles 58 being received within the slots 46 and 48 so that they extend outwardly therebeyond. Those bristles on the arches 60 are disposed within the forward open end of the tubular member 38 and leave suction spaces therearound. The forward end of the tubular member 38 is preferably tapered as indicated at 70 so that the suction intake spaces around the forward bristles are presented toward the sides of the tool and also forwardly thereof. The longitudinally extending bristles 58 do not necessarily fill the slots 46 and 48 so that spaces between the bristles and the edges of the slots also serve as suction intake spaces which keep the brush clean in addition to the suction intake openings 50 provided adjacent these bristles and along the slots.

In Figs. 7 and 8, a modified form of brush unit is illustrated in which the bristles are of substantially uniform thickness or density throughout, but in which the construction is different from that disclosed in Figs. 5 and 6. In this construction, a backing or mounting member 72, which is of channel-section and corresponds to the member 56, has the bristles fixed therein and is then bent into substantially U-shape. The bristles 74 are fixed within the channel of the member 72 completely therearound, and with this construction alone the arched forward end, indicated at 76, is thinned out as the bristles are pulled around the arch. Additional sectors 78 and 80 are adapted to overlie the arched portion 76 so that the resulting structure is of substantially uniform bristle thickness or density throughout. The sectors 78 and 80 may each include metal arched segments 82, of cross-sectional configuration similar to the cross-sectional configuration of the member 72, which holds the bristles of the sectors 78 and 80 in place. The sectors 78 and 80 may be positioned as shown in Fig. 7, and the segment elements 82 welded to the base of the member 72 in order to fix these sectors in position.

Referring to Figs. 9 to 11, another embodiment of the invention is illustrated in which the bristles extend around the front and along one side only of the hollow tubular members 38. In this embodiment of the invention only one of the longitudinal slots, namely 46, is provided and the slot 48, as in the embodiment above described, is dispensed with. The suction intake openings 50 are provided along each side of the slot 46.

The brushing unit includes a longitudinally extending mounting member 84 which is curved downwardly at the forward end thereof, as indicated at 86, and then bent forwardly, as indicated at 88, to provide a front support for the brush unit. The rear end thereof is bent downwardly at 90 and then upwardly at 92 to provide a resilient spring means which is adapted to bear against the inner wall of the member 38. The slot 46 is widened adjacent the forward end thereof, as indicated at 94, so that a plurality

of brush elements may be transversely disposed within the enlarged portion 94. A central mounting member 96 is disposed longitudinally of the member 84 from the rear down around the curved front thereof and is of channel configuration, as in the embodiment described above for mounting bristles 98.

Members 99 similar to members 96 but shorter are provided which are disposed on each side of the member 96 adjacent the forward end thereof and within the enlarged space 94. These members 99 each retain bristle elements 101 which extend around the arch at the forward end thereof within the forwardly facing opening of the tubular member 38. The members 99 and the members 96 may be welded to the top surface of the member 84 and around the arch 86 thereof so that the brush may be mounted as a unit within the tubular member 38.

The forwardly extending portion 88 serves to support the forward end of the brush unit and the resilient leg 90 serves to resiliently support the rear end thereof to mount the brush unit. The member 94 is wedged up into the opening 46, as indicated in Fig. 10, so that the brush unit is firmly retained in place. The bristles around the arch have suction intake spaces therearound through the forwardly facing opening of the member 38, and the suction intake openings 50 lie adjacent the longitudinally extending bristles so that as the dust is loosened by the bristles it is drawn into the interior of the tube 38.

In Figs. 12, 13 and 14 a modified form of the structure illustrated in Figs. 9 to 11 is shown in which means are provided for varying the effective suction intake openings and in which the brush unit is in another form. In this embodiment of the invention a longitudinally extending slot 106 is provided which corresponds to the slot 46 above described but which is wider than slot 46. Suction intake openings 50 are provided through the wall of the member 38 along and adjacent the edges of the slot 106.

The member 84 is also wider than that in the embodiment described above and its edges are turned upwardly as indicated at 108 to serve as retaining walls for the bristles. A longitudinally extending member 110 is provided which is disposed centrally of the member 84 and extends longitudinally thereof and curved down around the arch 86 of the member 84. The member 110 has upwardly directed walls 112 which cooperate with the walls 108 to crimp the bristles 114 of a pair of brush elements. The bristles 114 extend longitudinally of the tubular members 38 and are arched around the front end thereof in the same manner as those described in the last mentioned embodiment.

The overlying central portions of the elements 84 and 110 are provided with suction intake openings 116 therethrough so that the dust between the adjacent brushes may be drawn into the tubular element.

In order to control the effective areas of the openings 50, a closure member 118 is slidably disposed within the tubular member 38. The member 118 has a pair of curved arms 120 adjacent the rear end thereof which lie to the rear of the element 84 and slidably bear against the side and bottom wall of the member 38. Forwardly extending arms 122 are provided on the member 118, which are disposed on each side of the member 84, underlying each row of openings 50. The arms 122 have openings 124 therethrough which are adapted to underlie the openings 50

when the member 118 is in one position. A longitudinally extending slot 126 is provided through the top of the member 38, and a finger button 128 is provided which is attached to the member 118 through the slot. By grasping the button 128, the member 118 may be slid longitudinally of the member 38 so that the openings 124 may be positioned to underlie the openings 50 thereby providing free access to the interior of the tubular member, or may be slid to such a position that the openings 50 are either partially or wholly closed.

In Fig. 15 a modified form of the structure illustrated in Fig. 14 is shown in which the openings 50 are dispensed with. In this structure the suction intake openings are still provided in the forwardly opening end of the tubular member 38 but the sole communication through the longitudinal wall thereof is through the openings 116 which are located between the brushes 114.

In Figs. 16, 17, 18 and 19, another modified form of the present invention is illustrated, in which the forward end of the member 38 is open, but not tapered, and in which a single slot 46 is provided having the adjacent openings 50 arranged along the side edges thereof. The brushing unit is of a different construction from those described above and includes a bottom plate member 132 which is curved at its sides as indicated at 134 to a configuration complementary to that of the internal configuration of the lower half of the member 38. The curved ends 134 tend to spring outwardly so that they resiliently bear against the inner side walls of the member 38 to hold the unit in position. The mounting means for the bristles 138 are provided by cutting through the member 132 along lines 135 and 137 and then folding these portions upwardly to form side walls 136. These side walls 136 with that portion of the member 132 therebetween form a retaining channel similar to the member 96. The sides 136 retain the bristles 138 which extend upwardly through the elongated slot 46. Upstanding plate members 139 are positioned on each side of the walls 136 adjacent the forward end of the member 132 and are provided with flanges at the lower ends thereof, which are welded to the member 132 to provide a mounting means for forwardly extending brushes 140. Upstanding channel sections 142 are welded to the plate member 139 and are channel-shaped to retain the bristles of the brushes 140 therein.

Another upstanding channel strip 150 is welded to the forward end of the strip 136 and retains therein a resilient bumper element 152 of suitable resilient material such as sponge rubber. This bumper element 152 extends forwardly of the forward end of the member 38 and serves as a bumper for protecting any objects being cleaned and also protecting the forward end of the tool.

In Figs. 20 and 21, the construction of the ferrule 40 is illustrated in detail. The rear end of the tubular element 38 is enlarged and suitably tapered, as indicated at 160, and provides a rounded annular shoulder or rib 162 adjacent the inner edge of the taper. A metal ferrule 40 is reversely bent upon itself, as indicated at 164, to fit over the outer edge of the element 38 and embraces the tapered portion 160. Longitudinally extending slots 166 are provided along the rear edge of the ferrule 40 at spaced intervals therearound. The inner edge of the ferrule is rolled inwardly at 167 so that the inwardly rolled portion overlies and extends inwardly beyond the

annular shoulder or rib 162. With this construction, the ferrule may be slipped over the tapered end of the member 38 and snapped into position through the engagement of the rolled end 167 over the shoulder 162, while the ferrule may be rotated relative to the tube 38. The taper 160 and the taper of the ferrule are at the proper angle so that a friction fit will be obtained between the ferrule and the inner wall of the collar 36.

In Fig. 22, a modified and improved manner of attaching the ferrule to the tubular element 38, so that the ferrule may rotate relative to the tube, is illustrated in which a ferrule 170 is shown as embracing the tapered portion 160 of the tubular element 38 and has a reversely bent portion 172 which forms an annular pocket for the reception of the end of the element 38. An annular groove 174 is provided in the member 38 adjacent the rear end thereof, and the reversely bent portion 172 is then rolled to form an annular rib 176 which snaps within the groove 174 when the ferrule is applied.

Formal changes may be made in the specific embodiment of the invention described without departing from the spirit and substance of the invention, the scope of which is commensurate with the appended claims.

What is claimed is:

1. A suction and brushing tool comprising an elongated tubular member open at its forward end, means forming longitudinally and oppositely disposed slots in said member adjacent the forward end thereof, and a brushing unit disposed within said member, said brushing unit including bristles fixed to a mounting member, said bristles extending longitudinally of said member on opposite sides thereof disposed within and extending through said slots, respectively, and bristles disposed around an arc at the forward end of said mounting means extending through said open end, the brush along the sides and arc thereof being of uniform bristle density.

2. A suction and brushing tool comprising an elongated tubular member open at its forward end, means forming a longitudinally extending slot through the wall of said member adjacent its forward end, means forming suction openings through said wall adjacent said slot, a brushing unit removably disposed within said member through the forward end thereof, said unit including bristles extending through said slot, other bristles within said open end leaving suction spaces therearound, and resilient mounting means on said unit resiliently engaging the inner wall of said member.

3. A suction and brushing tool comprising an elongated tubular member open at its forward end, means forming a longitudinally extending slot through the wall of said member adjacent its forward end, means forming suction openings through said wall adjacent said slot, means within said member adjacent said suction openings movable to vary the effective size thereof, a brushing unit removably disposed within said member through the forward end thereof, said unit including bristles extending through said slot, and other bristles within said open end leaving suction spaces therearound.

4. A suction and brushing tool comprising an

elongated tubular member open at its forward end, means forming a longitudinally extending slot through the wall of said member adjacent its forward end, means forming suction openings through said wall adjacent said slot along opposite sides of said slot, a slidable member disposed within said tubular member having openings therethrough complementary to said suction openings, said slidable member being movable longitudinally of said tubular member to vary the effective sizes of said suction openings, a brushing unit removably disposed within said member through the forward end thereof, said unit including bristles extending through said slot, and other bristles within said open end leaving suction spaces therearound.

5. A suction and brushing tool comprising an elongated tubular member open at its forward end, means forming oppositely disposed longitudinally extending slots through the wall of said member adjacent its forward end, means forming suction openings through said wall adjacent said slots, a brushing unit mounted within said member adjacent the forward end thereof, said unit having longitudinally disposed, outwardly extending bristles extending through said oppositely disposed slots and having other bristles disposed on an arch around the forward end of said member within said open end, and an additional section of bristles disposed on said arch to provide a brush construction of substantially uniform bristle density throughout.

6. A suction and brushing tool comprising an elongated tubular member open at its forward end, said member being slightly flattened on opposite sides thereof adjacent said forward ends, means forming oppositely disposed longitudinally extending slots through the flattened walls of said members, means forming suction openings through said walls adjacent said slots, a brushing unit removably disposed within said member within the forward end thereof, said unit including a generally U-shaped mounting means, oppositely extending longitudinally disposed bristles on opposite sides of said mounting means disposed within said slots, other bristles disposed on an arch around the forward end of said mounting means disposed within said open end leaving suction spaces therearound, and a transversely extending plate member fixed to said mounting member and engaging the inner walls of said tubular member to mount the brushing unit therein.

7. A suction and brush tool comprising an elongated tubular member open at its forward end, forwardly extending bristles disposed within said open end leaving forwardly open suction spaces in said open end adjacent said bristles, other bristles disposed longitudinally of said member adjacent said open end, said other bristles extending outwardly beyond said member, means forming suction openings adjacent said other bristles communicating with the interior of said member, and resilient means disposed within said open end and extending forwardly beyond the end thereof providing a resilient bumper adjacent said forwardly extending bristles.

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