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(54) **FLEXIBLE CLEANING TOOL WITH REPLACEABLE NON-WOVEN PAD AND CLEANING FLUID RESERVOIR**

FLEXIBLES REINIGUNGSGERÄT MIT AUSWECHSELBAREM VLIESTOFFBELAG UND
BEHÄLTER FÜR EINE REINIGUNGSFLÜSSIGKEIT

INSTRUMENT DE NETTOYAGE SOUPLE AVEC TAMPON NON TISSE REMPLAÇABLE ET
RESERVOIR DE LIQUIDE DE NETTOYAGE

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Description

BACKGROUND OF THE INVENTION

2. Field of the Invention

[0001] The present invention relates to the field of cleaning devices such as hand held dusters and dust mops, bathroom cleaners, toilet cleaners and other cleaning devices. More particularly, the present invention relates to a flexible cleaning device for accommodating the cleaning or dusting of difficult to access surfaces having a handle defining a cradle for receiving a fluid reservoir attached to a support arm for mounting a cleaning implement. The entire system is capable of either wet, damp or dry dusting or cleaning.

3. Discussion of the Related Art

[0002] For decades, hand held feather dusters, dust rags and other cleaning implements have been used as cleaning tools for the removal of dust adhering to furniture such as dressers and coffee tables, electrical appliances such as computers, lights, interior walls, lintels and the like. Thus, it is generally well known to remove dust or dirt from floors, furniture, and other household surfaces by rubbing a dust rag, cloth or other cleaning implement against the surface to be cleaned such that the dust or dirt adheres to the cleaning implement.

[0003] Despite the existence of numerous dusting or cleaning implements, dusting or cleaning of surfaces in hard to reach and inaccessible areas remains a common problem. Currently, in order to clean behind a heavy appliance such as a television or stereo, a user must physically move the appliance to enable the user to adequately clean behind it. Certain fixtures, such as radiators and base board heaters in older homes are immovable and present a significant challenge for cleaning. Likewise, other odd shaped or difficult to reach surfaces such as the inner rim of a toilet seat or the spindle on a staircase provide challenges to cleaning.

[0004] While hand held dusters and other cleaning implements are generally well known in the art, numerous drawbacks exist with the current commercially available designs. For example, U.S. Application Pub. No. US 2004/0034956 A1 U.S. Patent No. 6,813,801, U.S. Patent No. 5,953,784 and U.S. PatentNo. 6,550,092, disclose variations of hand held cleaning devices incorporating a disposable cleaning pad. These devices, while somewhat suitable for the desired application, exhibit notable limitations. For example, none of the above-cited references provide an elongated flexible support arm that allows a user to bend the duster or cleaning device into a variety of shapes. Instead, most prior art hand held dusters or cleaners utilize rigid supports that do not allow a user to shape the duster into unique configurations to enable the user to dust or clean behind hard to reach places. While some prior art devices exhibit a movable

joint to enable better storage or shipping, such devices are typically constructed to be flexible only in the one direction, and as such its cleaning capability is restricted by its maneuverability. The duster of the present invention overcomes the disadvantages of the prior art since, inter alia, it is constructed of an elongated rod which is flexible in all directions.

[0005] In general, the majority of improvements to hand held dusters and cleaners have been directed at improving the basic mechanical components of the cleaning device. These improvements have been directed at providing an inexpensive yet robust implement for dry dusting or cleaning. However, notably absent in the prior art is any attempt to provide a hand held cleaning implement that allows for rotational movement to allow for a flexible cleaning device.

[0006] US 5,123,763 discloses a cleaning tool for the removal of debris and subsequent cleaning of lug nuts for a wheel including an elongate handle removably mounted to a socket and having a fluid reservoir and a cleaning media.

[0007] However, there are no known prior art hand held cleaning implements that allow for selective wet, damp or dry dusting. The addition of water or other cleaning solution to most cleaning pads or systems has been known to increase the efficiency of the cleaning device in absorbing dust and other debris. Despite this knowledge, there are presently no known hand held cleaning systems, with flexible support members that include an attached water or cleaning fluid reservoir accessible on the cleaning implement to allow a user to single handedly alternate between wet, damp or dry dusting. To date, prior art dusting and cleaning devices require a user to obtain a separate spray bottle or other liquid application means if one desires wet dusting or cleaning.

SUMMARY OF OBJECTS OF THE INVENTION

[0008] Consistent with the foregoing, and in accordance with the invention as embodied and broadly described herein, a cleaning device, a cleaning system, and a method of cleaning are disclosed in suitable detail to enable one of ordinary skill in the art to make and use the invention.

[0009] In one embodiment, a cleaning system includes a cleaning tool including a handle defining an interior recess for receiving a fluid reservoir and a cleaning media support pivotally attached to the handle. The support is capable of pivoting rearwardly from a cleaning position and includes a portion moveable into a plurality of desired shapes. A cleaning media is attached to the cleaning media support and a fluid reservoir is attached to the handle in the cradle. The reservoir is capable of applying fluid to a surface to be cleaned and to the surface of the cleaning media.

[0010] In one embodiment, a cleaning media support is comprised of a two part support head comprising a semi-rigid first part pivotally attached to the handle por-

tion and a flexible second part attached to the first part. The flexible second part may be comprised of a plurality of interconnected segments or a piece of wire or other flexible material preferably insert-molded into a polymer. In one embodiment, the piece of wire is insert-molded into a plurality of polymer vertebrae like members.

[0011] In still another embodiment, a cleaning device includes a handle portion, a cleaning pad support attached to the handle portion and a retaining means for retaining the cleaning pad support in a desired shape. The cleaning pad support may include an insert plate, a plurality of interconnected segments such as discrete rotatable interconnected segments having a male end and a female end for connecting to an adjacent discrete rotatably interconnected segment or a piece of wire insert-molded into a polymer.

[0012] The handle portion may include an opening configured to allow access to a cradle and the cleaning pad support may be moveable between a first cleaning position and a second cleaning pad liquid application position. A cleaning fluid dispenser may be housed within the cradle.

[0013] In another embodiment, the cleaning pad support may include a pair of attachment members. The cleaning pad support may also include a circular pivot member at one end configured to fit within a pivot member receiving cavity in the handle portion. The circular pivot member may include a plurality of notches and the handle portion may include a semi-flexible engagement tab projecting downward into the pivot member receiving cavity. The engagement tab may fit within the notches for selective pivoting of the cleaning pad support.

[0014] In yet another embodiment, a cleaning system includes a cleaning tool having a handle defining an interior recess for receiving a fluid reservoir and a cleaning media support including a portion moveable into a plurality of desired shapes. The system further includes a cleaning media attached to the cleaning media support and a fluid reservoir attached to the handle in the recess capable of applying fluid to a surface to be cleaned and to the surface of the cleaning media. In one embodiment, the cleaning media support comprises a pair of flexible attachment members. The attachment members may include insert plates.

[0015] In a final embodiment, a method of cleaning includes bending a flexible support member of a cleaning tool to a desired cleaning position, applying a cleaning solution from a fluid reservoir in a handle attached to the flexible support member to a surface to be cleaned or to a cleaning pad attached to the support member and moving the cleaning pad across a surface to be cleaned.

[0016] These, and other, aspects and objects of the present invention will be better appreciated and understood when considered in conjunction with the following description and the accompanying drawings. It should be understood, however, that the following description, while indicating preferred embodiments of the present invention, is given by way of illustration and not of limitation.

Many changes and modifications may be made within the scope of the present invention without departing from the spirit thereof, and the invention includes all such modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] A clear conception of the advantages and features constituting the present invention, and of the construction and operation of typical mechanisms provided with the present invention, will become more readily apparent by referring to the exemplary, and therefore non-limiting, embodiments illustrated in the drawings accompanying and forming a part of this specification, wherein like reference numerals designate the same elements in the several views, and in which:

FIG. 1 is a perspective view of an embodiment of a partially assembled flexible cleaning device illustrating a pivotable handle with cleaning fluid reservoir receiving cradle attached to an alternative cleaning pad support member;

FIG. 2 is a side view of the flexible cleaning device illustrated in FIG. 1 illustrating a liquid application position in phantom;

FIG. 3 is a top plan view of the flexible cleaning device illustrated in FIG. 1 with the attached cleaning pad shown in phantom;

FIG. 4 is a top plan view of the flexible cleaning device illustrated in FIG. 1 with the attached cleaning pad shown in phantom illustrating the cleaning pad support member in an angled position;

FIG. 5 is a magnified partial cross-sectional view of the cleaning pad support taken along line 11-11 of FIG. 2 illustrating the insert molded wire spine;

FIG. 6 is a top plan view of a second embodiment of an assembled flexible cleaning device illustrating a pivotable handle having a cleaning fluid reservoir receiving cradle attached to an alternative cleaning pad support member,

FIG. 7 is a side view of the flexible cleaning device illustrated in FIG. 6 illustrating a liquid application position in phantom;

FIG. 8 is a magnified cross-sectional view of part of the cleaning device taken along line 14-14 of FIG. 6 illustrating an alternative cleaning head support;

FIG. 9 is a perspective view of a third embodiment of an assembled flexible cleaning device incorporating the pivotable handle with cleaning fluid reservoir receiving cradle illustrated in FIGS. 1-7 attached to an alternative cleaning pad support member;

FIG. 10 is a similar perspective view of the third embodiment illustrated in FIG. 9 without the cleaning pad attached;

FIG. 11 is an exploded perspective view of the third embodiment shown in FIG. 10 illustrating the component parts of the cleaning device; and

FIG. 12 is a rear exploded perspective view of the

third embodiment shown in FIG. 10 illustrating the underside of the component parts of the cleaning device.

[0018] In describing the preferred embodiments of the invention, which are illustrated in the drawings, specific terminology will be resorted to for the sake of clarity. However, it is not intended that the invention be limited to the specific terms so selected and it is to be understood that each specific term includes all technical equivalents, which operate in a similar manner to accomplish a similar purpose. For example, the word "connected" or "attached" and terms similar thereto are often used. They are not limited to direct connection or attachment but include connection through other elements where such connection is recognized as being equivalent by those skilled in the art.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0019] The present invention and the various features and advantageous details thereof are explained more fully with reference to the non-limiting embodiments described in detail in the following description.

1. System Overview

[0020] In a basic form, the invention is a cleaning system that includes a handle, cleaning pad or duster, and a flexible cleaning pad support capable of supporting a cleaning pad or other cleaning implement. The cleaning system allows a user to dust in a variety of different places because the flexible cleaning pad support can be formed into a variety of shapes. Despite its flexibility, the support maintains its shape. A 360° cloth allows the system to be used to clean multiple surfaces at once. In additional embodiments, the cleaning system is designed for use in wet, damp or dry cleaning and includes a fluid reservoir or liquid delivery system and the cleaning pad support is moveable via a pivotable connection to the handle portion. The cleaning system allows for fluid application directly to a cleaning pad or to a surface to be cleaned. This results in a single hand operated tool that provides options for wet, damp or dry cleaning not available in traditional cleaning devices.

2. Detailed Description of Preferred Embodiments

[0021] Specific embodiments of the present invention will now be further described by the following, non-limiting examples which will serve to illustrate various features of significance. The examples are intended merely to facilitate an understanding of ways in which the present invention may be practiced and to further enable those of skill in the art to practice the present invention. Accordingly, the below examples should not be construed as limiting the scope of the present invention.

[0022] FIGS. 1-5 illustrate an embodiment of the pre-

ferred cleaning system and FIGS. 6-8 illustrate a second embodiment of the preferred cleaning system. As will become apparent from the description that follows, the cleaning systems illustrated in FIGS. 1-8 are designed for use in wet, damp or dry cleaning and include a fluid reservoir or liquid delivery system within a pivotally attached handle. The cleaning system allows for fluid application directly to a cleaning pad or to a surface to be cleaned. The alternative embodiments of the cleaning system preferably include a cleaning tool that includes a handle defining a fluid reservoir receiving cradle and a pivotally attached cleaning pad support member. In addition to the benefits of the flexible duster previously described, this results in a single hand operated tool that provides options for wet, damp or dry cleaning not available in traditional cleaning devices.

[0023] FIGS. 1-6 illustrate an embodiment of the preferred cleaning system 220. Cleaning system 220 is generally comprised of a cleaning device or tool 222, including a handle portion or handle 224 pivotally or moveably attached to a flexible cleaning pad support member, cleaning pad support, flexible support rod or flexible support member 226, and a cleaning pad or cleaning implement 228 attached to the cleaning tool 222 via the cleaning pad support member 226.

[0024] As illustrated by FIGS. 1-6, handle portion 224 is preferably a curved ergonomically designed member configured to comfortably fit within the palm of a hand of a user. Handle portion 224 includes an integral top 223, first sidewall 225a, second sidewall 225b, rear wall 227 and bottom. Handle portion 224 may be constructed from a variety of synthetic resins, plastics or other suitable materials. In the preferred embodiment, handle portion 224 is constructed from polypropylene. Although the handle portion 224 may be constructed in a wide variety of sizes depending on the intended use, in the preferred embodiment, handle portion 224 is approximately 8.5 inches or 215.9 mm long, 1.3 inches or 33.2mm wide and 1.7 inches or 43.18mm high. These preferred dimensions allow for ease of use, manipulation, packaging, shipping and storage of the cleaning system 220 as well as increasing the overall ergonomics of the design. Handle portion 224 may be constructed in a variety of colors for increased aesthetic appeal. It may additionally be constructed from a translucent material.

[0025] As will be described in greater detail below, handle portion 224 defines a fluid reservoir-receiving cradle, recess or bay 231. In the preferred embodiment, the insertion of the fluid dispenser or reservoir 233 into the cradle 231 finishes the ergonomic design or form of the handle portion 224. Thus, the palm of a user's hand extends over the top 223 handle portion 224 and the user's fingers extend at least partially around the fluid reservoir 233. Additionally, the preferred curved ergonomic design of the handle portion 224 is constructed in a manner such that the pivot point defined by the pivot member receiving cavity 235 is located below the horizontal plane defined by the fluid reservoir 233 within the cradle 231. Such an

orientation is advantageous in maximizing fluid application as discussed in greater detail below.

[0026] Near the center of the handle portion 224 is an opening or hole 237 extending through handle portion 224 into the bottom of the handle portion. In the illustrated embodiment, opening 237 is approximately 2.5 inches, or 6.5mm. from a pivot member receiving cavity 235 located at the forward end of the handle portion 324. As illustrated in FIG. 7, opening 237 provides a user single-handed access into a fluid reservoir-receiving cradle, recess or bay 231 defined in the bottom of the handle portion 224. Near the forward end of the handle portion 224, above the pivot member receiving cavity 235 is a cantilevered pivot engagement tab 241, extending downwardly into the pivot member receiving cavity 235 described in greater detail below.

[0027] FIGS. 1-3 and 7 illustrate one preferred embodiment of a fluid reservoir 233 of the cleaning system 220. In the illustrated embodiment, fluid reservoir 233 is in the form of a fluid dispenser or a pump-activated spray bottle configured to retain water or a specialized fluid. The fluid may generally comprise, without limitation: any all-purpose cleaner, oil or water based dust inhibitor, anti-static, anti-microbial, antibacterial, sanitizing and de-odorizing agent, dusting agent, glass cleaner, furniture polish, leather or vinyl treatment, other cleaning agent, wax, polish or shining agent, softening agent, friction-enhancing compound, perfumes, dish cleaner, soap, insect repellent or insect barrier, exfoliator or other personal care product, paint for sponge painting or other application, water out emulsions, oil out emulsions, dust mite killer or repellent, abrasive cleaner, shoe polish, pet sanitation products, etc. known products. Known products include commercially available Pledge® Multi-Surface Cleaner, Pledge® Wood and Glass Cleaner, End Dust®, Fantastick® all purpose cleaner, Windex® glass cleaner, antibacterials such as Oust® or Lysol®, fragrances such as Glade®, leather or vinyl treatment such as Armor All®, fabric protectors such as Scotch Guard®, or fabric fresheners such as those manufactured by S.C. Johnson & Son, Inc. of Racine, Wisconsin, or Fabreze®.

[0028] The preferred spray bottle is a generally cylindrical bottle having an integral bottom, sidewall, second and third sections as disclosed in U.S. Patent Application Ser. No. 11/045,204, filed January 28, 2005 and incorporated by reference herein. As best described in U.S. Patent Application Ser. No. 11/045,204, a spray cap or nozzle is screwed or press fitted onto the top of the spray bottle. The spray cap includes a pair of opposed flats configured to selectively engage flanges of the fluid reservoir-receiving cradle 231. Alternatively, a system of tabs and grooves could be used to form a similar locking mechanism. The spray cap could alternatively include a one sided flat button or a tapered button. In addition, the fluid reservoir 233 could take a variety of forms including but not limited to an aerosol package, a deformable handle or reservoir that dispenses fluid by squeezing, a squirt gun or a flexible pouch with an attachable spray nozzle.

While the fluid reservoir 233 is illustrated as fitting within the cradle 231 of the handle portion 224, the fluid reservoir 233 may alternatively completely form the handle of the system, having only the upper portion of the cleaning system attached (i.e. the pivot member and the attachment members).

[0029] As best described in U.S. Patent Application Ser. No. 11/045,204, opposed flats of the spray cap can be used to provide for a tight fit within the handle portion 224, and further serve to properly orientate the fluid reservoir 233 within the cleaning system 220. Alternatively, it is understood that the fluid reservoir 233 could include other uniquely designed contours that allow for a mating tight fit within the fluid reservoir-receiving cradle 231.

[0030] U.S. Patent Application Ser. No. 11/045,204 illustrates one preferred embodiment of the fluid reservoir-receiving cradle 231 configured to retain the fluid reservoir 233. Cradle 231 is generally defined by a lower support, handle portion sidewalls and two U-shaped supports or rails and configured to receive the fluid reservoir 233 of the preferred embodiment. In the preferred embodiment illustrated in U.S. Patent Application Ser. No. 11/045,204, the lower support is comprised of a plurality of ribs extending from the inner side of rear wall of handle portion 224. The forward ends of the ribs define the lower support configured to support the bottom 244 of the fluid reservoir 233. In the preferred embodiment, ribs include a central rib having a length roughly equal to the diameter of the bottom of the fluid reservoir 233. The remaining ribs define progressively shorter lengths, thereby tapering off from the central rib and supporting the remainder of the circular bottom of the fluid reservoir. A pair of triangular retention tabs extend along opposed sides of the cradle 231 near the lower support. The retention tabs are configured to frictionally engage and retain the lower sidewall of the fluid reservoir 233. Extending forwardly from the retention tabs, the sidewalls of the cradle further define the sides of the fluid reservoir-receiving cradle 231 and are spaced in a manner to tightly fit around the sidewall of the fluid reservoir 233.

[0031] While in the illustrated preferred embodiment shown in the present application and in U.S. Patent Application Ser. No. 11/045,204, the fluid reservoir 233 is press fit or friction fit within the cradle 231 of the handle portion 224, it is recognized that alternative configurations could be utilized to retain the fluid reservoir 233 within the handle portion 224. For example, Velcro® or rubber bands could be included on a segment of the handle portion 224 in order to retain the fluid reservoir 233 within the handle portion 224. Other support structures or retaining features could be hingedly or otherwise attached to the handle portion 224 to retain the fluid reservoir 233 within the handle portion 224.

[0032] As illustrated in U.S. Patent Application Ser. No. 11/045,204, near the forward end of the fluid reservoir-receiving cradle 231 is a first U-shaped bottleneck receiving support. First bottleneck receiving support is configured to press fit around, receive and retain the fluid

reservoir of the preferred embodiment. First bottleneck receiving support is configured to press fit around the fluid reservoir near the junction of the second and third sections of the reservoir.

[0033] Slightly forward of the first bottleneck receiving support is a second U-shaped spray cap receiving support. Spray cap receiving support is configured to press fit around, retain and orientate the spray cap of the fluid reservoir. Spray cap receiving support is defined by a pair of flanges extending from the inner side of opposed sidewalls. The flanges are configured to press fit around flats of fluid reservoir spray cap when the reservoir is placed within the cradle 231. The tight fit defined by flanges and flats serves to properly orientate spray cap within the fluid reservoir-receiving cradle 231 such that the spray cap faces in a direction away from the cradle 231. Forward of the opening 237, are a plurality of structural support ribs extending forwardly towards the pivot member receiving cavity 235.

[0034] As best illustrated in FIGS. 6 and 11 of U.S. Patent Application Ser. No. 11/045,204, at the forward end of the bottom of the handle portion 224 is a pivot member receiving cavity 235. Pivot member receiving cavity 235 is defined between integral opposed ears 243a, 243b located at the forward end of the handle portion 224. Ears 243a, 243b include opposed grooves on their inner cavity surface configured to slidably engage the axles of a circular pivot member during assembly. Grooves have a width that is equal to or slightly wider than the diameter of the axles of the circular pivot member. It is understood that grooves and the pivot member receiving cavity 235 are configured to accommodate a variety of alternative cleaning pad support members 226 or other cleaning implements having pivot members attached at their proximal ends.

[0035] At the terminal end of the grooves, are pivot holes 245 configured to receive the axles of the circular pivot member and allow pivotable motion therein. A curved slot extends laterally from grooves and defines a passage configured to allow the movement of circular pivot retention tabs extending from the pivot member. On opposed sides of the forward end of the pivot member receiving cavity 235 are circular pivot retention tab holes 247 configured to engage and receive the circular pivot retention tabs located on the pivot member.

[0036] As best illustrated in U.S. Patent Application Ser. No. 11/045,204, projecting downwardly from the top 223 of the handle portion 224 into the pivot member receiving cavity 235 is a resiliently biased semi-flexible pivot engagement tab 241. Engagement tab 241 is comprised of a first end attached to the handle portion 224 and a second free end configured to engage notches on the outer surface of the pivot member.

[0037] Turning now to FIG. 1 of the present application, attached within the pivot member receiving cavity 235 of the handle portion 224 is the cleaning pad support member 226. Cleaning pad support member 226 is comprised of an integral circular pivot member (not shown), linking

section 251 and a two part support head generally designated 253. As best illustrated in U.S. Patent Application Ser. No. 11/045,204, circular pivot member includes integral axles on its opposed lateral sides. The axles are configured to fit within pivot holes 245 and rotatably pivot therein. Pivot member also includes a circular pivot retention tab. Circular retention tab is configured to fit within retention tab holes 247 and support the system is in the cleaning position. The pivot member defines three notches or indentations corresponding to alternative positions of the cleaning pad support member 226. A cleaning position notch, liquid application notch and storage position notch are defined on the external surface of the pivot member. In general, the preferred pivot assembly requires about between 2-3 lbf of pivot force in order to rotate it.

[0038] Integral with and extending from the pivot member is the linking section 251 and two part support head 253. In the preferred embodiment, the two part support head 253 of cleaning pad support member 226 includes a semi-rigid first part 255 comprised of a pair of parallel attachment members 257a, 257b, and a flexible second part 259 comprised of an insert molded wire spine 261. As illustrated in FIGS. 2-4, both the first part 255 and second part 259 are configured to engage a pocket or sleeve 271 (shown in phantom) of a cleaning pad 228 as is generally known in the art. Attachment members 257a, 257b may be spaced apart in a variety of configurations, however, in the preferred embodiment, attachment members 257a, 257b have a total width of about 1.25 inches, or 3.18mm. from opposed outside lateral edges. The preferred attachment members 257a, 257b are about .75 inches, or 1.91mm. thick and about .80 inches, or 2.03mm. wide. It is recognized that although the preferred embodiment illustrates a pair of attachment members 257a, 257b multiple configurations may be utilized. For example, a single, wider attachment member could be utilized as shown for e.g. in the third embodiment illustrated in FIGS. 6 and 7. Alternatively, three or more attachment members could be utilized.

[0039] Attachment members 257a, 257b include a plurality of spaced cleaning pad retaining tabs, barbs or projections 263 projecting from their upper surface. In the illustrated embodiment, retaining tabs 263 are triangular-shaped tabs having a first wall 265 extending in a generally vertical direction from the upper surface of the attachment members 257a, 257b and a second angled wall 267 sloping from the upper edge of the first wall 265 towards the distal end of the attachment members 257a, 257b. Tabs 263 are preferably raised about .05 inches, or 0.13mm. from the attachment members 257a, 257b. The unique triangular configuration of the retaining tabs 253 serves a dual function. The angled wall 267 allows for ease of placement of the cleaning pad 228 on the attachment members 257a, 257b during assembly, while the vertical first wall 265 retains the cleaning pad 228 on the attachment members 257a, 257b during the cleaning motion.

[0040] In addition to the unique configuration of the retaining tabs 263, their orientation on the attachment members 257a, 257b also serves to maintain the cleaning pad 228 on the attachment members 257a, 257b. In one embodiment, the attachment members 257a, 257b may be expandable, inflatable, partially inflatable, or include an inflatable portion. The inflatability provides for an improved fit of the cleaning pad 228 on the attachment members 257a, 257b as well as facilitating hands free removal of the cleaning pad 228 from the attachment members 257a, 257b.

[0041] As illustrated in FIGS. 1-5, the second part 259 of the cleaning pad support member 226 includes molded living hinges preferably with a wire traversing defining an insert molded wire-like spine 261. Preferably, a piece of wire 275 is insert-molded into a plurality of polymer spine vertebrae 277 to form the wire spine 261. The wire 275 is retained only at the first vertebra 287 in the spine 261 and floats through the remaining part of the spine 261, allowing the spine 261 to bend easily. A variety of known materials could be used for the wire 275 including Bx cable or other known wires or flexible materials.

[0042] Although it is recognized that the components of the wire spine 261 could take a variety of shapes, in the illustrated embodiment, the wire spine includes a plurality of hingedly connected hexagonally-shaped support vertebrae 277 interconnected by bridge portions 279. The hexagonally shaped vertebrae 277 include parallel outer sides 281a, 281b and four angled walls 283a-d connecting each individual vertebra 277 with the bridge portions 279. Preferably, the outer sides 281a, 281b of the hexagonal vertebrae are spaced apart a distance that generally corresponds to the width of the pocket or sleeve 271 of the cleaning pad 228 such that a tight fit of the cleaning pad 228 on the cleaning pad support member 226 can be achieved. The center of each vertebra 277 includes a circular opening 285 through which the coated wire 275 passes.

[0043] The wire spine 261 preferably includes a first vertebra 287 connected to or integral with the first part 255 of the cleaning pad support member 226. In addition, a terminal vertebra 289 is located at the distal end of the wire spine 261 opposite the first vertebra 287. The terminal vertebrae 289 preferably includes a rounded tip 291 that also allows for ease of insertion of the cleaning pad 228 on the cleaning pad support member 226. In the illustrated embodiment, terminal vertebrae 289 includes a plurality of slots or grooves 293.

[0044] The embodiment illustrated in FIGS. 1-5 provides a flexible cleaning pad support member 226 that is light enough for the user to bend easily, but stiff enough to retain its shape while in use. Insert-molding the wire 275 prevents the wire 275 from kinking as it would if it were not insert-molded and just naked. The wire 275 is retained only at one end in the spine 261 and floats through the remaining part of the spine 261, allowing the spine 261 to bend easily.

[0045] FIGS. 6-8 illustrate a second embodiment of

the preferred cleaning system 320. Cleaning system 320 is generally comprised of a cleaning device or tool 322, including a handle portion or handle 224 pivotally or moveably attached to a flexible cleaning pad support member, flexible support rod or flexible support member 326, and a cleaning pad or cleaning implement 328 attached to the cleaning tool 322 via the cleaning pad support member 226.

[0046] It should be apparent for the drawings that the third embodiment includes an identical handle portion 224 defining a fluid reservoir-receiving cradle, recess or bay 231, for receiving a fluid dispenser or reservoir 233 to that described in reference to FIGS. 7-11 and therefore the details of those parts need not be described and will be referred to using like reference numerals.

[0047] Turning now to FIG. 6 of the present application, attached within the pivot member receiving cavity 235 of the handle portion 224 is the cleaning pad support member 326. Cleaning pad support member 326 is comprised of an integral circular pivot member (not shown); linking section 351 and a two part support head generally designated 353.

[0048] In the illustrated embodiment, the two part support head 353 of cleaning pad support member 326 includes a first part 355 comprised of a single widened semi-rigid attachment member 357, and a second part 359 defining a flexible spine 361.

[0049] As illustrated in FIGS. 6-7, both the first part 355 and second part 359 are configured to engage a pocket or sleeve 371 (shown in phantom) of a cleaning pad 328 as is generally known in the art. Sleeve 371 defines a narrower portion 372 configured to receive the second part 359 of the cleaning pad support member 326 and a wider portion 374 configured to receive the first part 355 of the cleaning pad support member 326.

[0050] Attachment member 357 is preferably constructed from a semi-rigid material similar to that used to construct the handle. Preferably the attachment member 357 has a total width of about 1.25 inches, or 3.18mm. from opposed outside lateral edges. The preferred attachment member is about .75 inches, or 1.91mm. thick. Attachment member 357 includes a plurality of spaced cleaning pad retaining tabs, barbs or projections 363 projecting from its upper surface. In the illustrated embodiment, retaining tabs 363 are triangular-shaped tabs having a first wall 365 extending in a generally vertical direction from the upper surface of the attachment member 357 and a second angled wall 367 sloping from the upper edge of the first wall 365 towards the distal end of the attachment member 357. Tabs 363 are preferably raised about .050 inches, or 0.13mm. from the attachment member 357.

[0051] As illustrated in FIGS. 6-8, the second part 359 includes a flexible spine 361. The flexible spine 361 may be attached to the attachment member 357 in a variety of conventional ways. The elongated flexible spine 361 is capable of being manually moved into a plurality of differing shapes while at the same time exhibiting enough

strength to maintain its position during dusting or cleaning.

[0052] In the embodiment illustrated in FIGS. 6-8, the elongated flexible spine 361 is of the type marketed by Lockwood Products, Inc. under the trade designation LOC-LINE®. The elongated flexible spine 361 comprises a plurality of interconnected segments 340.

[0053] As illustrated in FIGS. 6-8, each segment 340 comprises a central body portion 342, a male end portion 344 and a female end portion 346. The male end portion 344 has an outer surface 348 comprising a frustum of a sphere and the female end portion 346 has a mating inner surface 350 comprising a frustum of a sphere which is dimensioned so that, when the male end portion 344 is inserted into the female end portion 346, there is frictional contact between the mating male end portion outer surface 348 and female end portion inner surface 350. These frictional forces function as retaining means to hold one segment 340 at any desired location relative to an interconnected segment 340. However, these frictional forces can be overcome permitting interconnected segments 340 to be moved relative to each other so that their longitudinal axes are either in or out of alignment and permitting unrestricted relative rotational movement therebetween. Thus, the static friction hold the segments in place and is overcome when a user initially starts moving the segments. Once in motion, the low dynamic friction that makes the segments 340 easy to move. This connection permits the attached cleaning pad 328 to have the same relative movements as the interconnected segments, as described above. The length of the elongated flexible cleaning pad support member 326 can be changed by adding or removing segments 340.

[0054] It should be understood that the component parts of the alternative embodiments can be interchanged.

[0055] It is conceived that the cleaning head support members, 226, 326 could be comprised of two smaller support members extending in parallel to one another and configured to fit within a cleaning pad having two parallel pockets, sleeves or support chambers. Such replaceable cleaning pads are disclosed in for example U.S. Patent Application Ser. Nos. 11/045,204, filed January 28, 2005 and 11/124,527 filed May 6, 2005.

[0056] FIGS. 9-12 illustrate a third embodiment of the preferred cleaning system 520. Cleaning system 520 is generally comprised of a cleaning device or tool 522, including a handle portion or handle 224 pivotally or moveably attached to a flexible cleaning pad support member, cleaning pad support, flexible support rod or flexible support member 526, and a cleaning pad or cleaning implement 528 attached to the cleaning tool 522 via the cleaning pad support member 526. Cleaning system 520 preferably includes a pair of bendable attachment members 508a, 508b.

[0057] As illustrated by FIGS. 9-12, handle portion 224 is a curved ergonomically designed member configured to comfortably fit within the palm of a hand of a user and

is identical to that previously described in relation to FIGS. 1-8.

[0058] Turning now to FIG. 10, at the forward end 525 of the bottom 531 of the handle portion 224 is a pivot member receiving cavity 235. Pivot member receiving cavity 235 is defined between integral opposed ears 243a, 243b located at the forward end 525 of the handle portion 224. Ears 243a, 243b include opposed grooves 552a, 552b on their inner cavity surface configured to slidably engage the axles 580a, 580b of a circular pivot member 582 during assembly. Grooves 552a, 552b have a width that is equal to or slightly wider than the diameter of the axles 580a, 580b of the circular pivot member 582. It is understood that grooves 552a, 552b and the pivot member receiving cavity 235 are configured to accommodate a variety of alternative cleaning pad support members 526 or other cleaning implements having pivot members 582 attached at their proximal ends.

[0059] At the terminal end of the grooves 552a, 552b, are pivot holes 245 configured to receive the axles 580a, 580b of the circular pivot member 582 and allow pivotable motion therein. A curved slot (not shown) extends laterally from grooves 552a, 552b and defines a passage configured to allow the movement of circular pivot retention tabs (not shown) extending from the pivot member 582. On opposed sides of the forward end of the pivot member receiving cavity 235 are circular pivot retention tab holes 587a, 587b configured to engage and receive the circular pivot retention tabs located on the pivot member 582.

[0060] Projecting downwardly from the top of the handle portion 224 into the pivot member receiving cavity 235 is a resiliently biased semi-flexible pivot engagement tab 241. Engagement tab 241 is comprised of a first end 539 attached to the handle portion 224 and a second free end 591 configured to engage notches 585 on the outer surface of the pivot member 582 as will be described in greater detail below.

[0061] Attached within the pivot member receiving cavity 235 of the handle portion 224 is the cleaning pad support member 526. Cleaning pad support member 526 is comprised of an integral circular pivot member 582, linking section 593 and support head generally designated 592. Circular pivot member 582 includes integral axles 580a, 580b on its opposed lateral sides. Axles 580a, 580b are configured to fit within pivot holes 245 and rotatably pivot therein. Pivot member 582 defines at least three notches or indentations 555 corresponding to alternative positions of the cleaning pad support member 526. Preferably, a cleaning position notch, liquid application notch and storage position notch are defined on the external surface of the pivot member 582. In general, the preferred pivot assembly requires about between 2-3 lbf of pivot force in order to rotate it.

[0062] Integral with and extending from the pivot member 582 is the linking section 593 and support head 592. In the preferred embodiment, support head 592 of cleaning pad support member 526 includes a pair of parallel bendable attachment members or attachment prongs

508a, 508b configured to engage the pockets or sleeves 510a, 510b of a cleaning pad 528 as is generally known in the art. Attachment members 508a, 508b may be spaced apart in a variety of configurations. Preferably, attachment members are constructed from a bendable material such as plastic, that will retain a plurality of different shapes. Attachment members 508a, 508b define a rounded leading edge 507 configured for ease of insertion into the sleeves 510a, 510b of cleaning pad 528. It is recognized that although the preferred embodiment illustrates a pair of attachment members 508a, 508b multiple configurations may be utilized. For example, a single, wider attachment member could be utilized. Alternatively, three or more attachment members could be utilized.

[0063] Attachment members 508a, 508b include a plurality of spaced cleaning pad retaining tabs, barbs or projections 563 projecting from their upper surface. In the illustrated embodiment, retaining tabs 563 are triangular-shaped tabs as previously described in the previous embodiments. As previously noted, the attachment members 508a, 508b may be expandable, inflatable, partially inflatable, or include an inflatable portion. The inflatability provides for an improved fit of the cleaning pad 528 on the attachment members 508a, 508b as well as facilitating hands free removal of the cleaning pad 528 from the attachment members 508a, 508b.

[0064] FIGS. 11 and 12 better illustrate features of the cleaning pad support member 526. As illustrated in the exploded views, the attachment members 508a, 508b of the cleaning pad support member 528 preferably include respective insert plates 530a, 530b inserted into the bendable attachment members 508a, 508b. The insert plates 530a, 530b act as a retaining means and allow the attachment members 508a, 508b to be manually moved into a plurality of differing shapes while at the same time exhibiting enough strength to maintain their position during dusting or cleaning.

[0065] As noted above, attachment members 508a, 508b are preferably constructed from a bendable material such as plastic. While attachment members 508a, 508b can take on a wide variety of alternative configurations, in the illustrated embodiment, attachment members 508a, 508b include a plurality of inward curves 532 and slotted regions 534 comprised of a plurality of individual slots 535. The described architecture enables the attachment members 508a, 508b to be moved into a plurality of alternative shapes while still being constructed from stiffer plastics. The curves 532 and slotted regions 534 of the attachment members 508a, 508b provide for regions of increased flexibility in comparison to the remaining portions of the attachment members 508a, 508b, thereby allowing for increased flexibility.

[0066] Insert plates 530a, 530b have a shape that preferably correspond to a portion of the attachment members 508a, 508b. As illustrated in FIGS. 19 and 20, insert plates 530a, 530b preferably include curved portions 536 corresponding to curved portions 532 on attachment

members 508a, 508b. Insert plates 530a, 530b also include holes 538 that may be used to secure insert plates 530a, 530b within attachment members 508a, 508b.

[0067] Insert plates 530a, 530b are preferably constructed from a material such as metal and may be insert molded into attachment members 508a, 508b. For example, aluminum or copper insert plates could be utilized. Other materials such as rubber or plastic may also be used. It is preferred that insert plates 530a, 530b be malleable enough to be bent into several shapes without breaking or snapping.

[0068] The sixth embodiment illustrated in FIGS. 17-20 therefore provides a flexible cleaning pad support member 526 having two attachment members 508a, 508b that are light enough for the user to bend easily, but stiff enough to retain their shape while in use.

[0069] The cleaning pad 528 utilized with the sixth embodiment is largely similar in materials and construction to that previously described. As noted, cleaning pad 528 may be comprised from a single cleaning pad or from multiple cleaning pads attached sequentially to cover the cleaning pad support member 526. Cleaning pad 528 is generally known in the art and comprised of a combination of fibers defining a cleaning surface 564 and attachment portion 562. In the illustrated embodiment, attachment portion 562 defines a pocket or sleeve 565 configured to tightly fit over support member 526. Attachment portion 562 may be constructed from an elastic material to snugly fit over the support member 526. Although in the illustrated embodiment, sleeve 565 is illustrated as having an open end and a closed end, it should be recognized that the sleeve 565 could have two open ends to allow the cleaning pad to be reversible and insertable on the support member 526 from either end. The reversibility of the cleaning pad 528 would allow for maximum use of the cleaning pad.

Methods of Use and Methods of Cleaning

[0070] It should be appreciated from the above disclosure that the preferred cleaning tools, 222, 322, 522 can be utilized to clean or dust a variety of surfaces. Due to the unique configuration of the tool, 222, 322, 522 a user can conveniently alternate the orientation of the cleaning tool, 222, 322, 522. It is recognized that the component parts of the invention may be conveniently interchanged depending on the particular cleaning task at hand. For example, some of the disclosed cleaning pads, 528 may be more suitable for use with some of the disclosed cleaning solutions or for dry dusting. Likewise, some cleaning pads, 528 may include alternate surfaces configured for alternative cleaning tasks. Similarly, the particular cleaning solution utilized can be changed depending on the desired application.

[0071] In order to perform cleaning a user may obtain the above mentioned cleaning system, 220, 320, 520 that includes the preferred cleaning tool, 222, 322, 522. A user holds the cleaning tool, 222, 322, 522 such that the

palm of the users hand surrounds the handle portion, 224.

[0072] Once the user obtains the tool, 222, 322, 522 a user then places the cleaning pad, 228, 328, 528 onto the flexible cleaning pad support member, 223, 326, 526. As noted above, the cleaning tool may be used with a variety of alternative cleaning pads. In the preferred embodiment, the sleeve-like cleaning pad, 228, 328, 528 is mounted over the cleaning pad support member, 226, 326, 526. Once secured, the user then positions the cleaning pad, 228, 328, 528 onto a surface to be cleaned and moves the cleaning pad, 228, 328, 528 on the surface to be cleaned. The movement of the cleaning pad, 228, 328, 528 across the surface to be cleaned causes dust or other debris to be collected by the cleaning pad, 228, 328, 528. In the illustrated embodiment, dust or other debris is collected by the cleaning surface of the cleaning pad, 228, 328, 528. The user may, depending on the surface to be cleaned, move the cleaning pad support member, 228, 328, 528 to accommodate hard to reach places. For example, if a user desires to dust an overhead lintel, the user may pivot the cleaning pad support member, 226, 326, 528 to an angle of about 90° in relation to the handle portion, 224, 324.

[0073] A preferred dusting or cleaning pattern consists of a side to side overlapping motion starting in the upper left hand (or right hand) side of the section to be cleaned, and progressing the wiping pattern across the surface to be cleaned continuing to use side to side wiping motions. Another preferred wipe pattern consists of an up-and-down wiping motion. The preferred wiping patterns allow the cleaning pad, 228, 328, 528 to loosen dirt and dust, and provide a better end result. Another benefit of the above wiping patterns is minimization of streaks as a result of improved spreading of solution (in wet dusting). Additionally a user can bend the support member, 226, 326, 526 into a "U" shape, so as to provide twice the dusting surface passing over a given space.

[0074] Once the cleaning or dusting has been finished, the user may remove and dispose of the cleaning pad, 228, 328, 528. As noted above, a variety of cleaning solutions can be used with the inventive cleaning system. In one preferred method of light cleaning or dusting a solution comprising 96.5125% by weight deionized water, 1.75% propan-2-ol anhydrous, .40% ethylene glycol monobutyl ether, .40% ethylene glycol n-hexyl ether, .125% propylene glycol, 10% monoethanolamine, 30% vinegar (white distilled 300 grain), and small amounts surfactants and other ingredients is utilized. This composition is ideally suited for dusting jobs. Use of the preferred solution with the inventive cleaning solution provides an increase in dust and allergen retention as well as providing an improved shine to the surface to be cleaned. Fingerprints, smudges and other blemishes are also easily removed.

[0075] Optionally, and most preferably, convenience and performance can be maximized by using a system composed of a disposable cleaning pad, 228, 328, 528 as described hereinbefore. The pad can be composed

of any one of the alternative cleaning pads described above.

[0076] Use includes the additional option of application of a cleaning solution to the cleaning pad 228, 328, 528 or directly to the surface to be cleaned. FIGS. 1-6 and 9 generally illustrate the cleaning systems 220, 320, 520 in their cleaning positions. In the cleaning position the cleaning pad support member 226, 326, 526 extends forwardly, pivot engagement tab 241 engages the cleaning position notch of pivot member, and retention tabs fit within the retention tab holes 247, 347. These engagement or retaining features create at least 2.5lbf of pivot force. This amount of force is sufficient to maintain the cleaning pad support member 226, 326, 526 in its fully extending cleaning position despite any torque experienced during normal dusting, drying, or cleaning motions. Thus, in the cleaning position, a user may manipulate the cleaning system 220, 320, 520 via the handle portion 224 as well as adjust the flexible cleaning pad support member 226, 326, 526. Additionally, the user may apply the water or other liquid housed within the fluid reservoir 233 directly onto the surface to be cleaned. The user may insert a finger through the opening 237 and depress the spray cap thereby causing the discharge of the fluid housed within the reservoir 233. Due to the orientation of the cleaning system 220, 320, 520 in the cleaning position, the liquid will typically be applied directly to the surface to be cleaned in an area behind the cleaning pad 228, 328, 528 when the system is in a horizontal orientation such as when dusting a coffee table. Alternatively, a cleaning solution can be sprayed onto a vertical surface to be cleaned, such as a window or door molding.

[0077] FIGS. 1 and 2 illustrate (in phantom) the cleaning system 220 in a second liquid application position. It should be understood that cleaning system 520 can occupy the same position. In order to move, the cleaning pad support member 226, 526 into the liquid application position a user must hold the handle portion 224 and apply torque to the cleaning pad support member 226, 526 to move it from the cleaning position illustrated. As sufficient torque is applied to overcome the forces of the inventive engagement features, the circular pivot member rotates downwardly into the liquid application position. In the liquid application position, pivot engagement tab 241 engages the liquid application notch of the pivot member thereby holding the cleaning pad support member 226, 326, 526 in its angled liquid application state. In the illustrated embodiment, the angle between the cleaning pad support member 226, 326, 526 and the handle portion 224 in the liquid application position may be between 45° and 68°. Preferably, the angle between the cleaning pad support member 226, 326, 526 and the handle portion 224 is between 55° and 68° with 63° being particularly preferred. This preferred angle takes into consideration the spray pattern of the fluid reservoir in order to achieve liquid application onto the greatest surface area of the cleaning surface of the cleaning pad 228, 328, 528.

[0078] During dusting or cleaning, a user may repeatedly rotate the cleaning pad support member 226, 326, 526 from its cleaning position to its liquid application position as needed. Alternatively, as noted above, a user may simply apply liquid directly to the surface to be cleaned while using the cleaning system 220, 320, 520 in the cleaning position.

[0079] Although not illustrated, the cleaning system 220, 320, 520 also includes a storage position. In the storage position, the cleaning pad support member 226, 326, 526 is rotated backwards such that it is generally parallel to the plane defined by the longitudinal axis of the handle portion 224. In this position, engagement tab 241 engages the storage position notch thereby maintaining cleaning pad support member 226 in its folded position. In the storage position, the cleaning system 220, 320, 520 may be easily stored into a variety of spaces such as kitchen drawers or cabinets. Alternatively, the system can be hung on a wall using the opening 232 in the handle portion 224.

[0080] The described cleaning systems 222, 322, 522 and methods of use provide multiple benefits versus conventional cleaning modes. It reduces time to clean or dust, because the cleaning pad retains a greater amount of dust and the preferred cleaning solution removes fingerprints smudges and other surface marks. Additionally, since a fresh pad may be used every time, germs and dirt are trapped, removed and thrown away, promoting better hygiene. Conventional dusting tools, which are reusable, can harbor dirt and germs, which can be spread throughout the household.

[0081] The cleaning pads are versatile in that they can be used for multiple cleanings and multiple surfaces. Each pad is designed to clean at least one average size surface with an average debris or dust load. Pads can be changed sooner if surfaces are larger than average, or especially dirty. To determine if the pad needs changing, visual inspection of the back of the cleaning surface of the cleaning pad will confirm if the cleaning surface is saturated with dust and/or dirt.

[0082] To maximize the synergy between the various cleaning, and dusting tasks, the present methods can be carried out using several varying executions and instructions for use. In one embodiment, a kit can be provided that has multiple cleaning pads and solutions for different cleaning tasks. One solution and cleaning pad could be used for surface cleaning and another solution and pad for dusting. The solution bottles and pads may be color coordinated by use. The kit may be sold separately with advertising and instructions in each kit being used to explain the benefits of using the various products together.

[0083] It is understood that the component parts of the inventive systems, 220, 320, 520 described above may be manufactured and sold separately or together in the form of a cleaning system or kit. It should be further understood the present invention contemplates a variety of additional alternative configurations and component parts which may be attached to the cleaning pad support

member. A wide variety of alternative interchangeable cleaning implements may be substituted for the cleaning pad support member, 226, 326, 526 described above. For example, and in no way limiting, an alternative cleaning implements could include a squeegee for cleaning windows, mirrors or other glass structures, a soft surface cleaner such as a lint roller, a glass cleaner including an indexing refill roll, an insect swatter, a dog brush or other grooming implement, a scrub brush, sponge, mop, paint brush, toilet brush or other cleaning implement etc. Numerous other cleaning implements are also within the scope of the present invention.

[0084] Furthermore, although the preferred embodiment illustrates a flexible cleaning pad support, 226, 326, 526 it is recognized that the present invention is in no way limited to such a construction. The cleaning pad support, 226, 326, 526 could alternatively be connected to the handle portion via a threaded connection. Such an orientation would allow for the ease of attachment and removal of the numerous alternative cleaning implements that are within the scope of the present invention.

Claims

1. A cleaning system (220; 320; 520) including:

a cleaning tool (222; 322; 522) comprising:

a handle (224) defining an interior recess (231) for receiving a fluid reservoir (233);
a cleaning media support (226; 326; 526);
and

a cleaning media (228; 328; 528) attached to the cleaning media support;

characterized in that

the cleaning media support includes a portion moveable into a plurality of desired shapes; and

a fluid reservoir is attached to the handle in the recess, the reservoir capable of applying fluid to a surface to be cleaned and to the surface of the cleaning media.

2. The cleaning system of claim 1, wherein the cleaning media support (226; 526) comprises a pair of flexible attachment members (257a, 257b; 508a, 508b).

3. The cleaning system of claim 2, wherein the pair of attachment members (508a, 508b) include insert plates (530a, 530b).

4. The cleaning system of claim 1, wherein the cleaning media support (326) is comprised of a plurality of interconnected segments (340).

5. The cleaning system of claim 1, wherein the cleaning media support (226) is comprised of a piece of wire

(275) insert-molded into a polymer.

6. The cleaning system of claim 1, wherein the cleaning media support (226; 326; 526) is pivotally attached to the handle (224).

7. A method of cleaning comprising:

bending a flexible support member (226; 326; 526) of a cleaning tool (222; 326; 526) to a desired cleaning position;
applying a cleaning solution from a fluid reservoir (233) in a handle (224) attached to the flexible support member to a surface to be cleaned or to a cleaning pad (228; 328; 528) attached to the support member; and
moving the cleaning pad across a surface to be cleaned.

Patentansprüche

1. Reinigungssystem (220; 320; 520) mit:

einem Griff (224), der eine innere Ausnehmung (231) zur Aufnahme eines Fluid-Behälters (233) umschließt;
einem Reinigungsmittelträger (226; 326; 526);
und
einer an den Reinigungsmittelträger angesetzten Reinigungseinrichtung (228; 328; 528);
dadurch gekennzeichnet, dass
der Reinigungsmittelträger einen Teil aufweist, der in mehrere Soll-Gestalten bewegbar ist; und
an den Griff in der Ausnehmung ein Fluid-Behälter ansetzbar ist, mit dem ein Fluid auf eine zu reinigende Oberfläche und auf die Reinigungseinrichtung aufbringbar ist.

2. Reinigungssystem nach Anspruch 1, bei dem der Reinigungsmittelträger (226; 526) ein Paar flexibler Ansetzelemente (257a, 257b; 508a, 508b) aufweist.

3. Reinigungssystem nach Anspruch 2, bei dem die Ansetzelement-Paare (508a, 508b) Einsetzplättchen (530a, 530b) aufweisen.

4. Reinigungssystem nach Anspruch 1, bei dem der Reinigungsmittelträger (326) eine Vielzahl untereinander verbundener Segmente (340) aufweist.

5. Reinigungssystem nach Anspruch 1, bei dem der Reinigungsmittelträger (226) ein Stück Draht (275) aufweist, das in ein Polymerisat eingeformt ist.

6. Reinigungssystem nach Anspruch 1, bei dem der Reinigungsmittelträger (226; 326; 526) am Griff (224) schwenkbar befestigt ist.

7. Reinigungsverfahren mit folgenden Schritten:

Biegen eines flexiblen Trägers (226; 326; 526) eines Reinigungswerkzeugs (222; 322; 522) in eine gewünschte Reinigungslage;
Auftragen einer Reinigungslösung aus einem Fluid-Behälter (233) in einem an den flexible Träger angesetzten Griff auf eine zu reinigende Fläche oder auf ein an den Träger angesetztes Reinigungskissen (228; 328; 528); und
Bewegen des Reinigungskissens über die zu reinigende Fläche.

Revendications

1. Système de nettoyage (220; 320; 520) incluant :

un outil de nettoyage (222; 322; 522) comprenant :

une poignée (224) définissant un évidement intérieur (231) pour recevoir un réservoir de fluide (233) ;

un support d'élément de nettoyage (226; 326; 526) ; et

un élément de nettoyage (228; 328; 528) fixé sur le support d'élément de nettoyage ;

caractérisé en ce que

le support d'élément de nettoyage inclut une partie mobile en une pluralité de formes souhaitées ; et

un réservoir de fluide est fixé sur la poignée dans l'évidement, le réservoir pouvant appliquer un fluide sur une surface à nettoyer et sur la surface de l'élément de nettoyage.

2. Système de nettoyage selon la revendication 1, dans lequel le support d'élément de nettoyage (226; 526) comprend une paire d'éléments de fixation flexibles (257a, 257b; 508a, 508b).

3. Système de nettoyage selon la revendication 2, dans lequel la paire d'éléments de fixation (508a, 508b) inclut des plaques d'insert (530a, 530b).

4. Système de nettoyage selon la revendication 1, dans lequel le support d'élément de nettoyage (326) est composé d'une pluralité de segments interconnectés (340).

5. Système de nettoyage selon la revendication 1, dans lequel le support d'élément de nettoyage (226) est composé d'une pièce de fil métallique (275) moulé en insert dans un polymère.

6. Système de nettoyage selon la revendication 1, dans lequel le support d'élément de nettoyage (226; 326;

526) est fixé de manière pivotante à la poignée (224).

7. Procédé de nettoyage comprenant :

de plier un élément de support flexible (226; 326; 526) d'un outil de nettoyage (222; 322; 522) dans une position de nettoyage souhaitée ;
d'appliquer une solution de nettoyage à partir d'un réservoir de fluide (233) dans une poignée (224) fixée sur l'élément de support flexible sur une surface à nettoyer ou sur un patin de nettoyage (228; 328; 528) fixé sur l'élément de support ; et
de déplacer le patin de nettoyage sur une surface à nettoyer.

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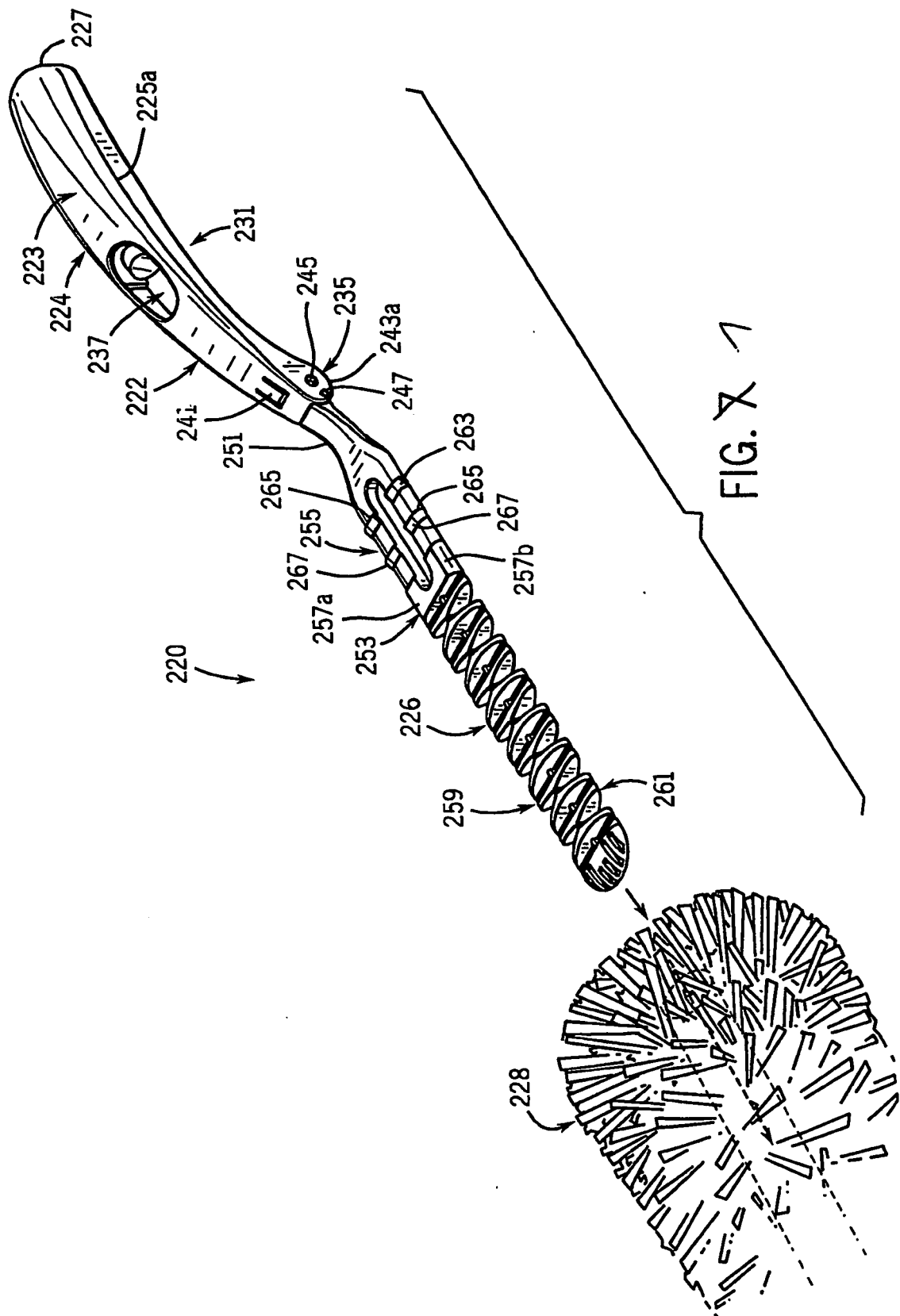
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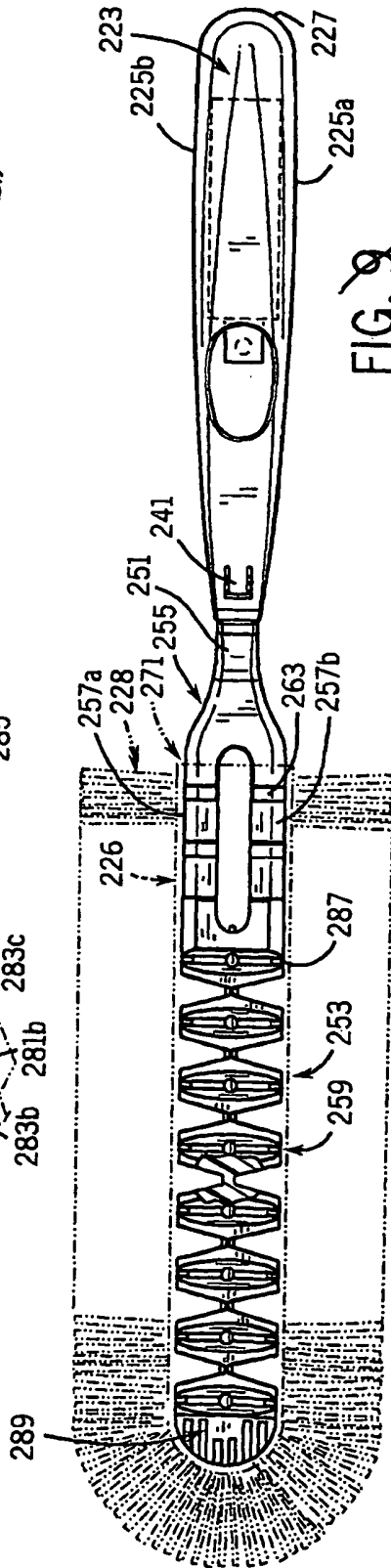
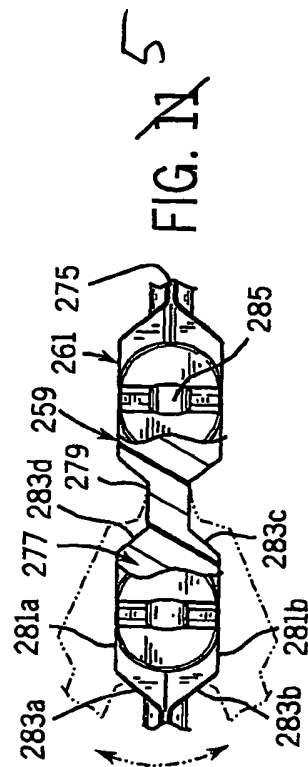
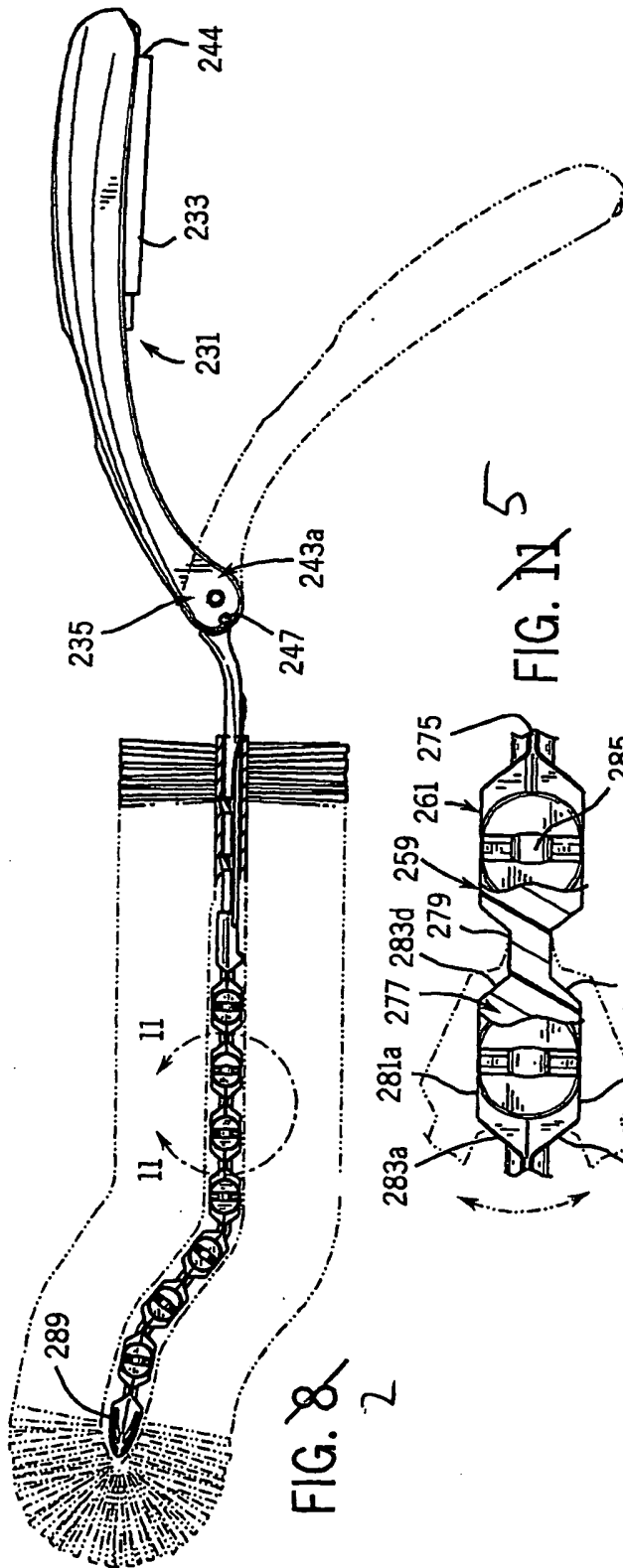
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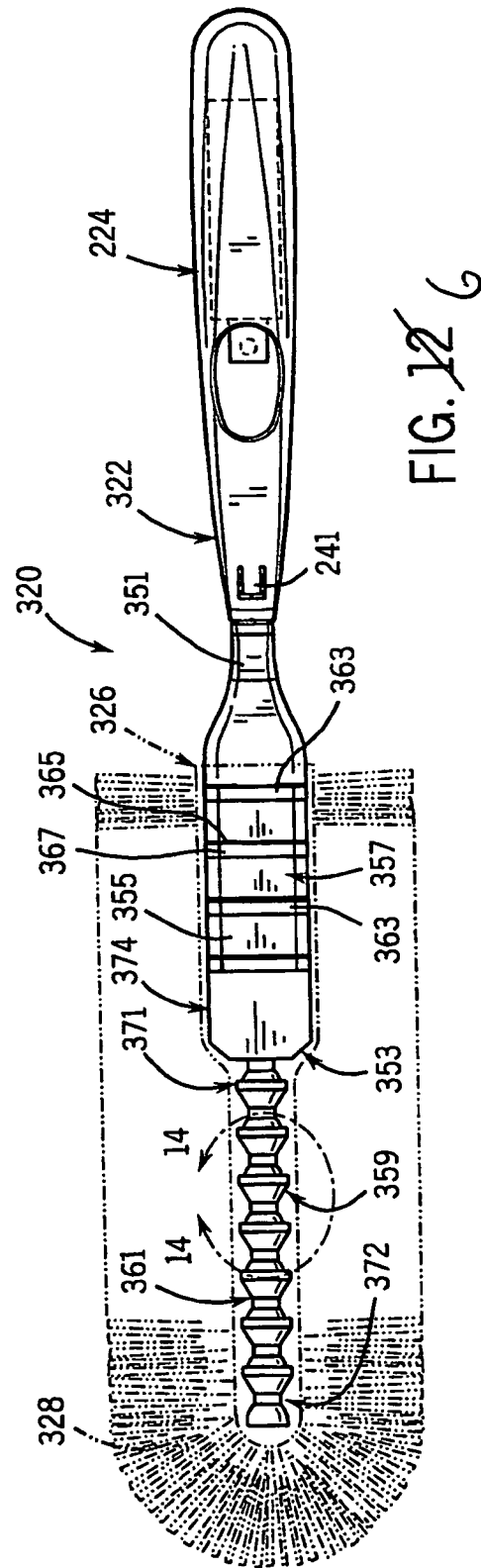
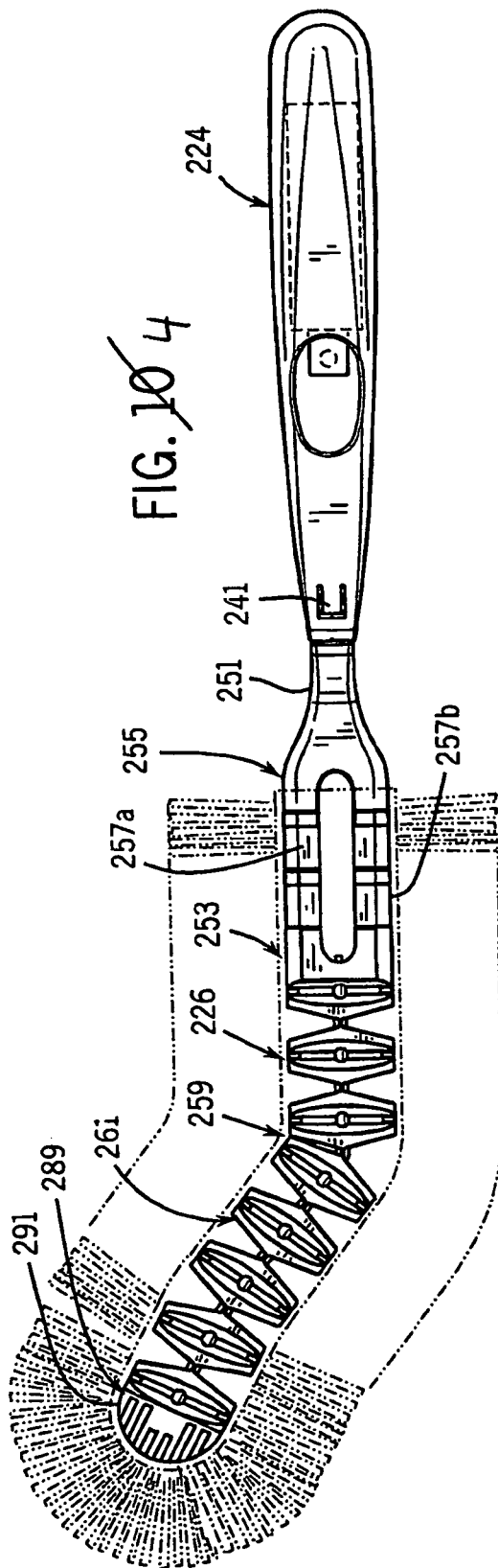
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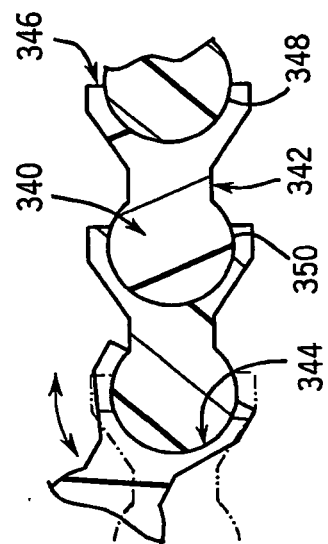
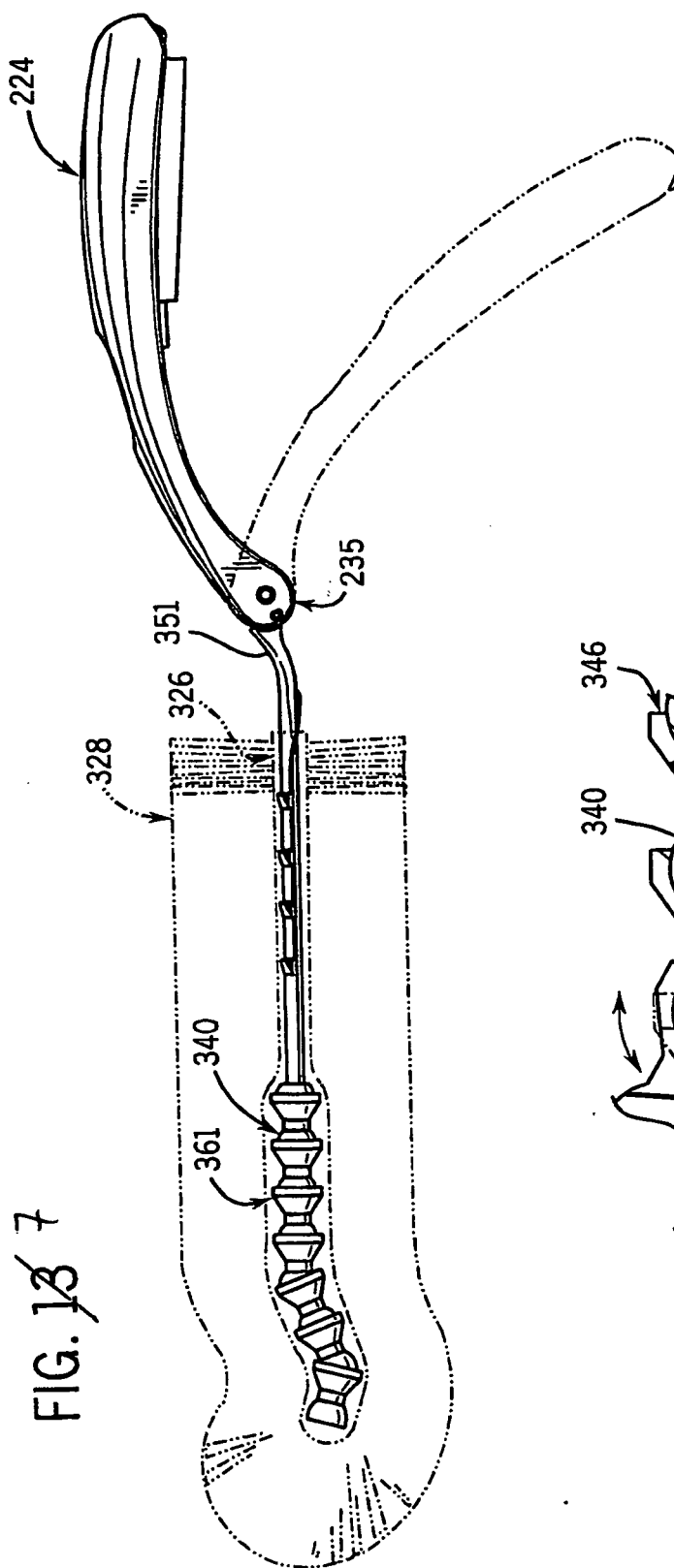
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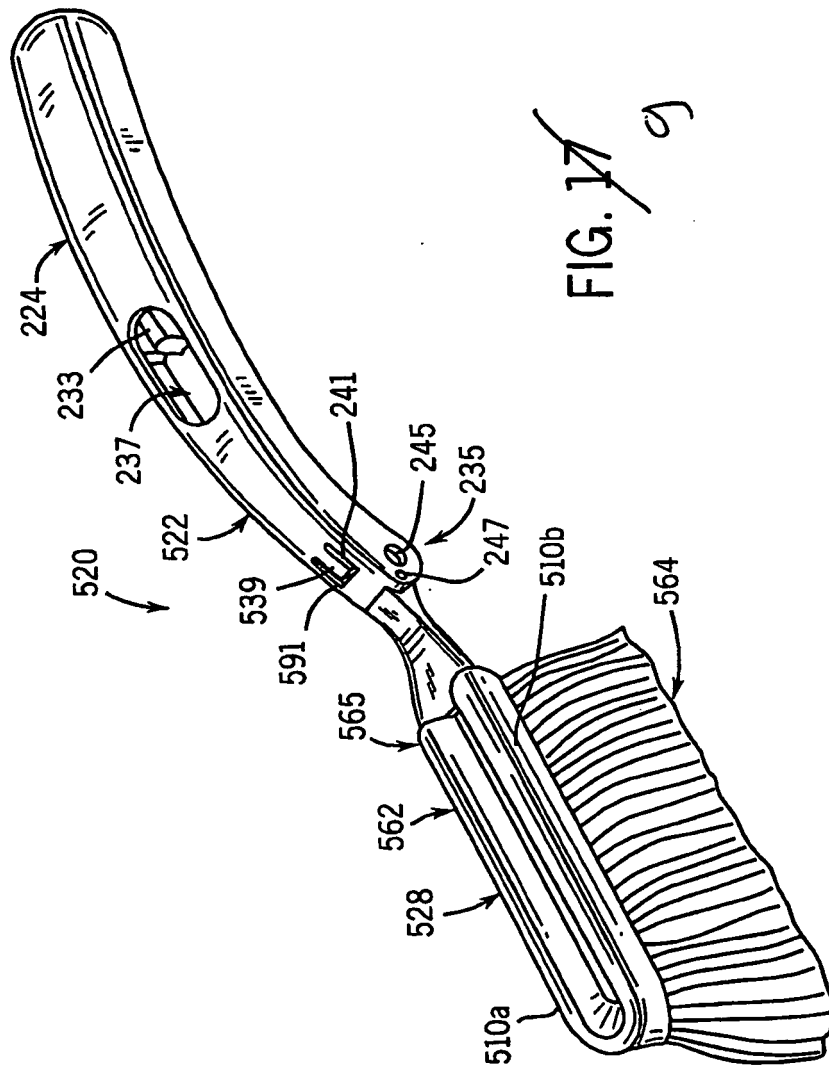
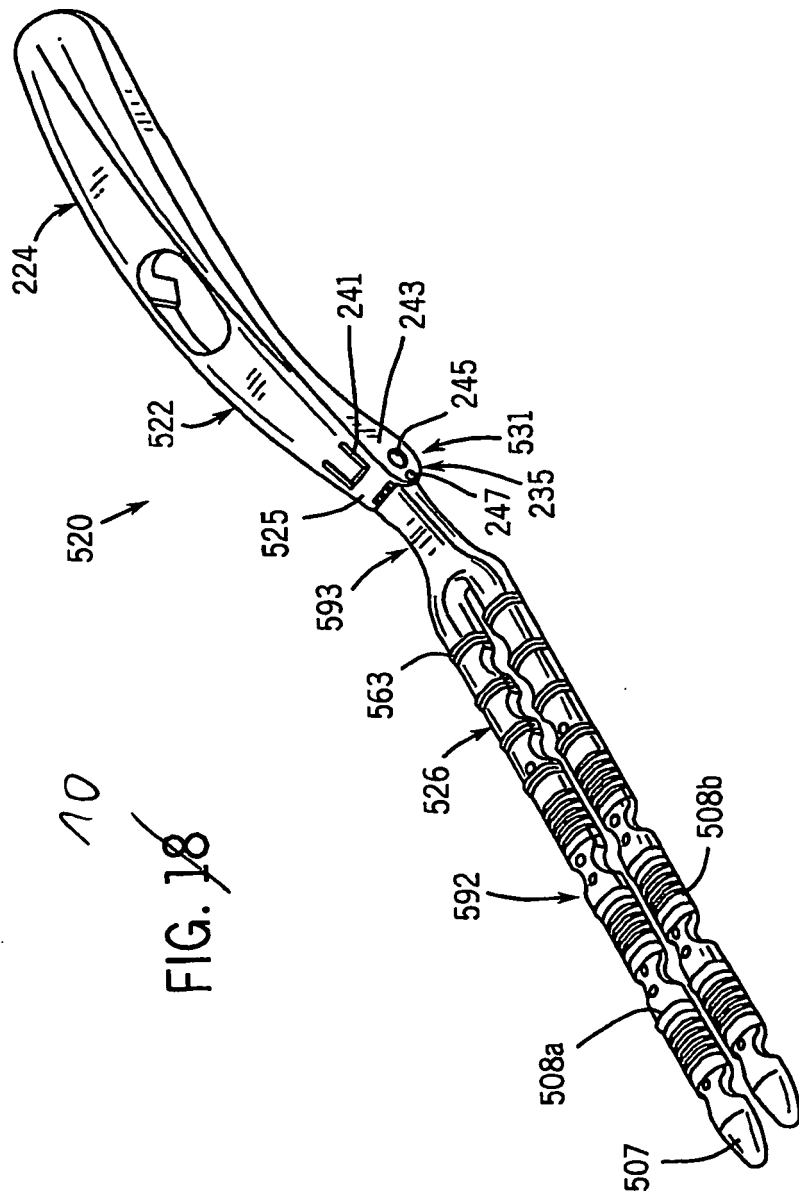
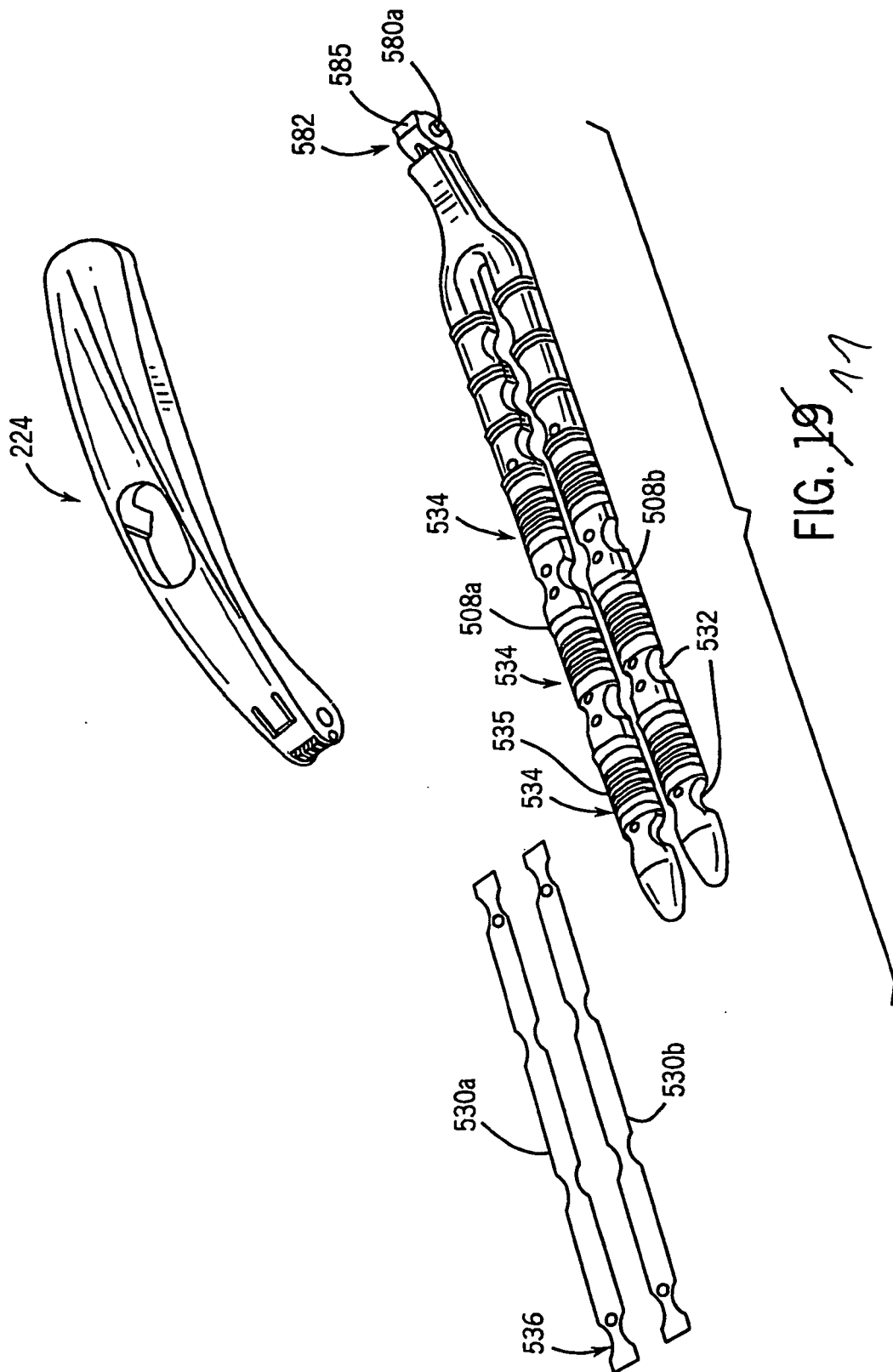
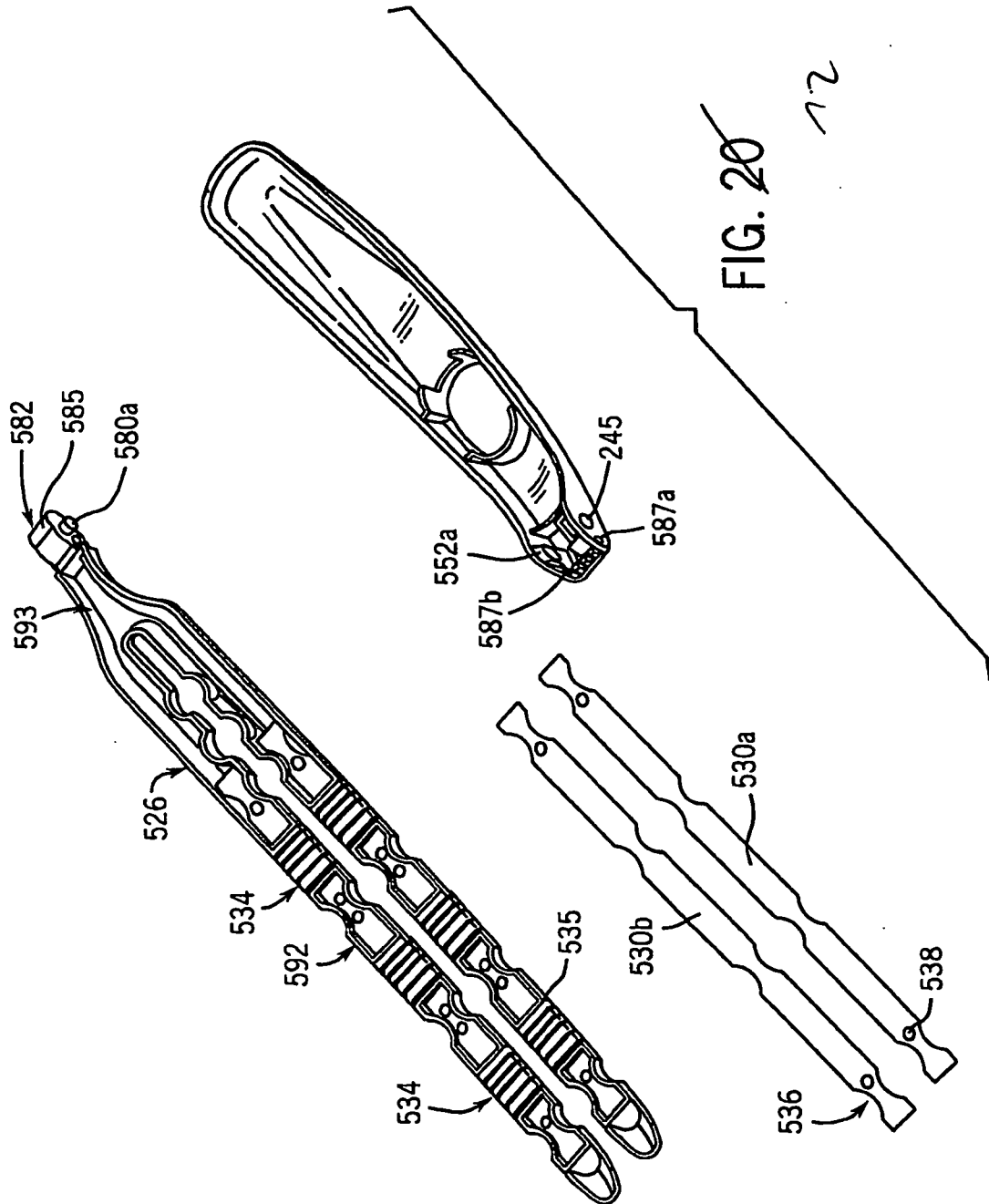


FIG. 17







REFERENCES CITED IN THE DESCRIPTION

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