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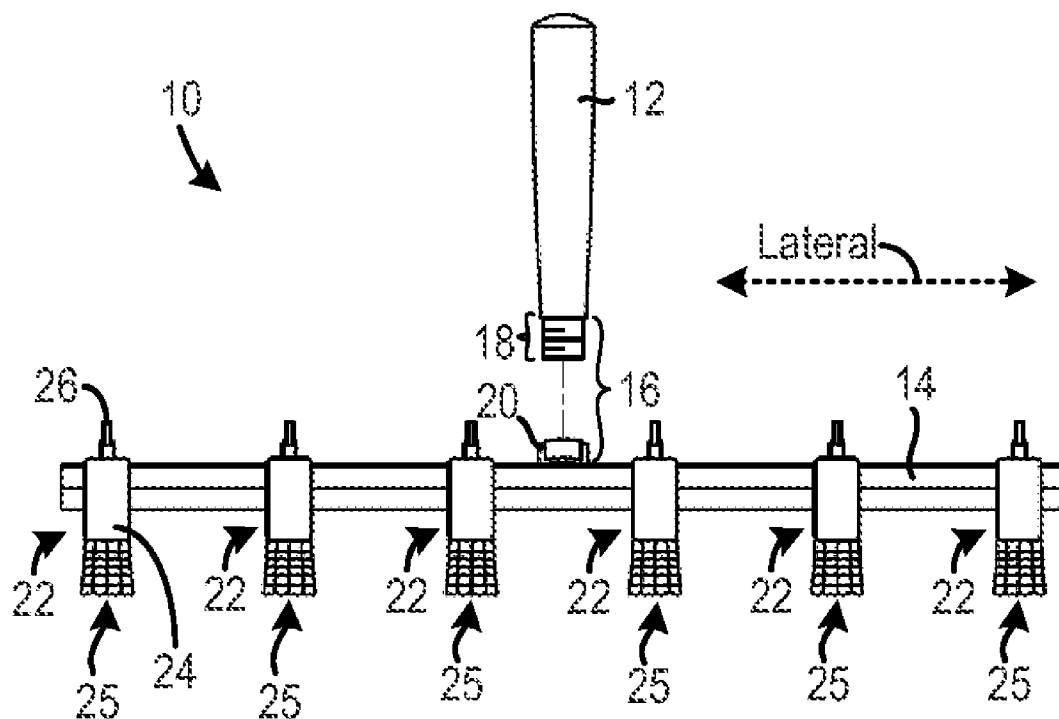
(19) **United States**(12) **Patent Application Publication**  
**Hill**(10) **Pub. No.: US 2014/0250616 A1**(43) **Pub. Date: Sep. 11, 2014**(54) **MULTIPURPOSE CLEANING DEVICE****Publication Classification**(71) Applicant: **James M. Hill**, Eugene, OR (US)(72) Inventor: **James M. Hill**, Eugene, OR (US)(21) Appl. No.: **14/199,543**(22) Filed: **Mar. 6, 2014**(51) **Int. Cl.***A46B 7/00* (2006.01)*A46B 9/02* (2006.01)(52) **U.S. Cl.**CPC .... *A46B 7/00* (2013.01); *A46B 9/02* (2013.01)USPC ..... **15/146****Related U.S. Application Data**

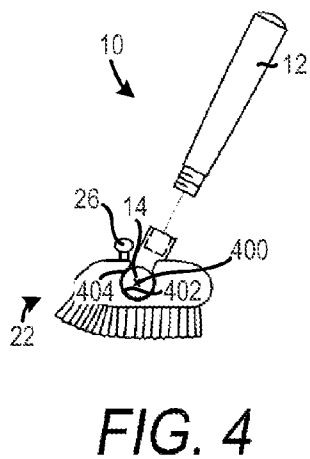
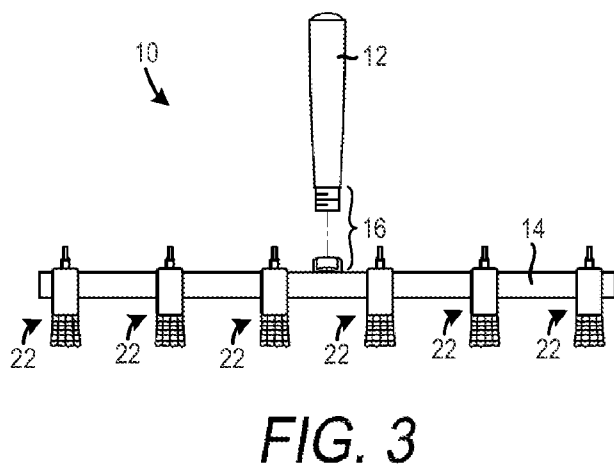
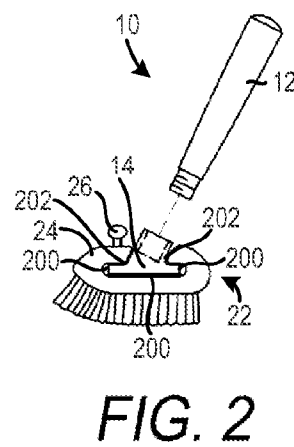
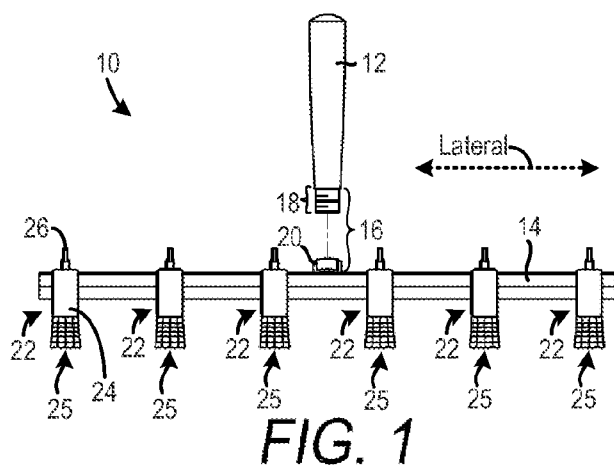
(60) Provisional application No. 61/773,952, filed on Mar. 7, 2013.

(57)

**ABSTRACT**

A cleaning device including a handle coupled to a flange that allows multiple adjustable attachments for cleaning applications is described herein. The relative position of the attachments and the flange may be adjusted to enable the device to be used on a wide variety of cleaning surfaces.





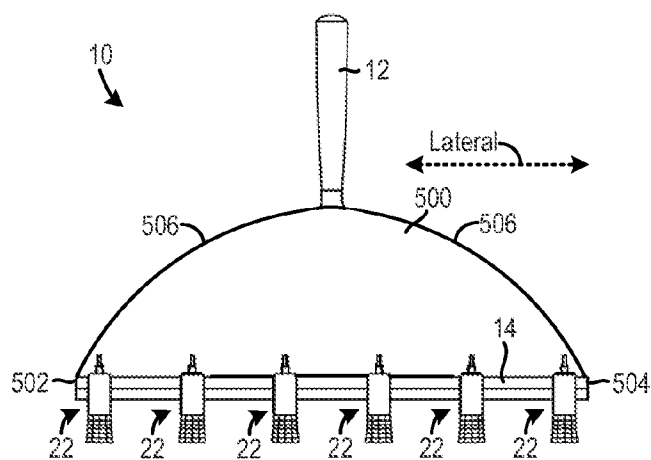


FIG. 5

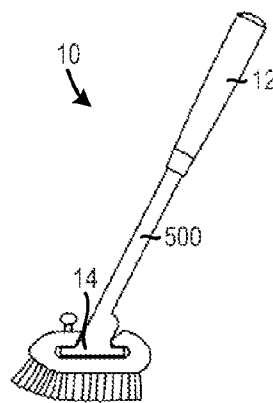


FIG. 6

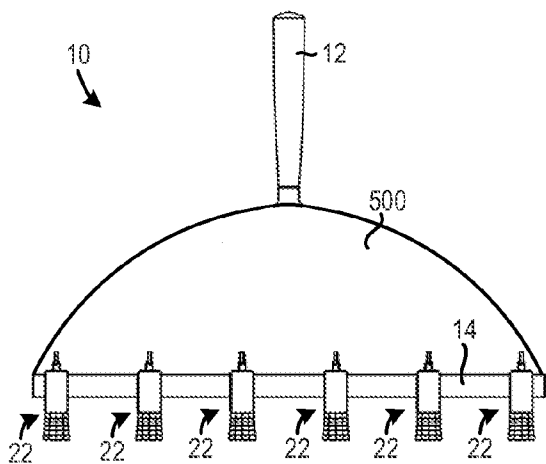


FIG. 7

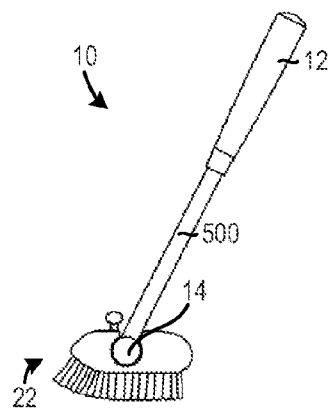


FIG. 8

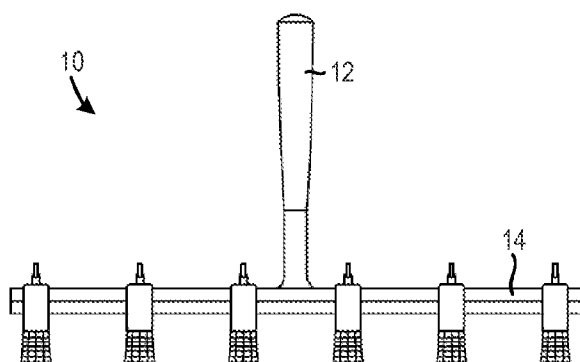


FIG. 9

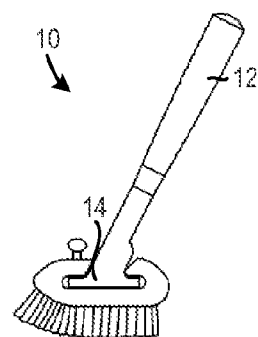


FIG. 10

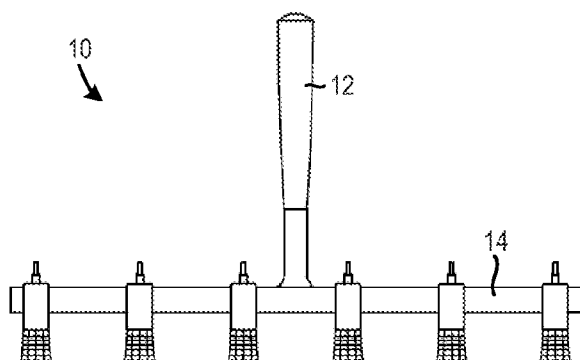


FIG. 11

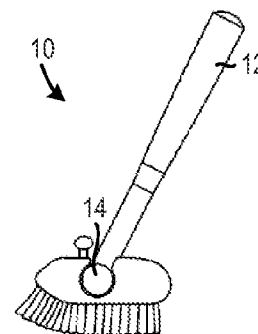


FIG. 12

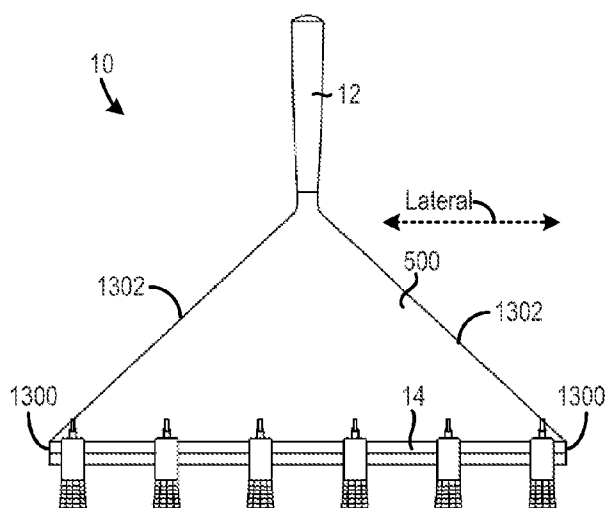


FIG. 13

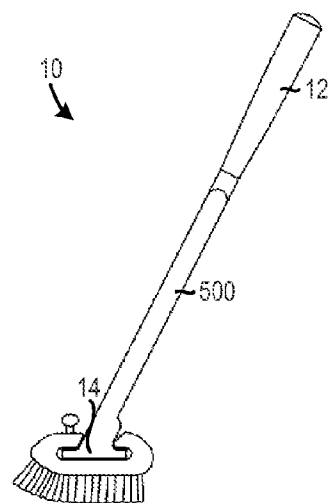


FIG. 14

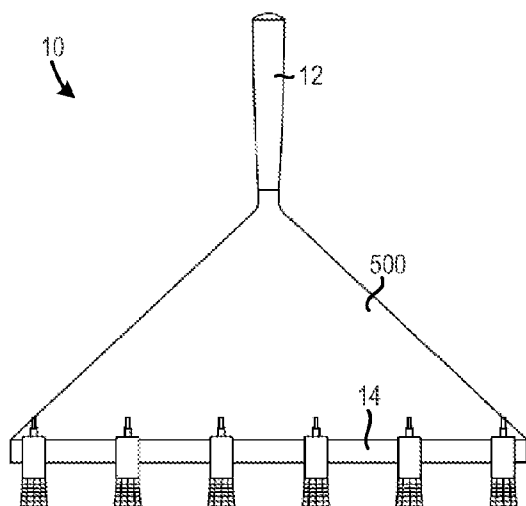


FIG. 15

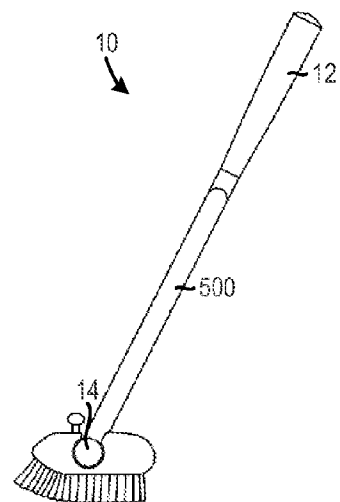


FIG. 16

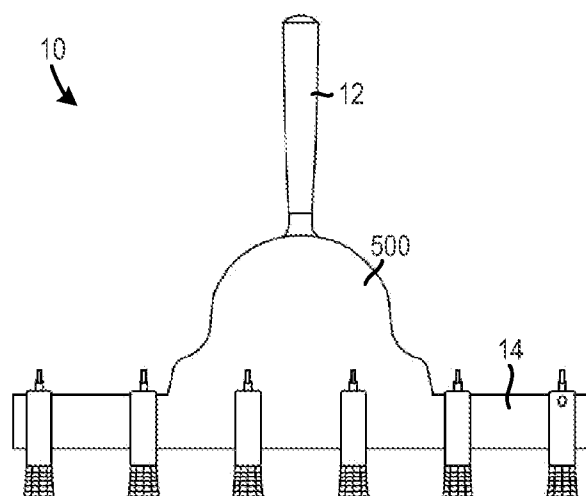


FIG. 17

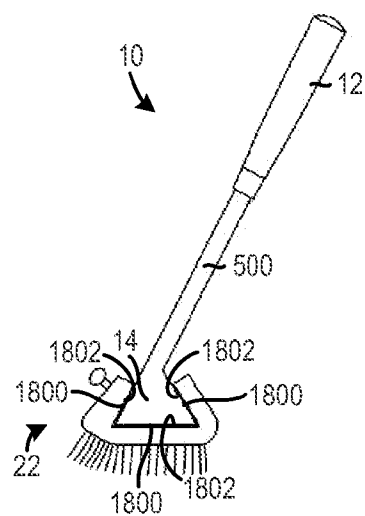


FIG. 18

## MULTIPURPOSE CLEANING DEVICE

### CROSS REFERENCE TO RELATED APPLICATION

[0001] The present application claims the benefit of and priority to U.S. Provisional Patent Application No. 61/773,952, filed Mar. 7, 2013 and titled MULTIPURPOSE CLEANING DEVICE, the content of which is incorporated herein by reference for all purposes.

### BACKGROUND

[0002] Tiled surfaces are spaced apart when installed and these spaces are typically filled with grout. The grout surface is usually recessed from the tile surface, making the grout surface difficult to clean when using conventional cleaning tools that use broad sweeping motions such as a mop or sponge. The recessed location of the grout tends to collect dirt, which requires frequent cleaning and the rough texture of the grout requires increased pressure to clean. Moreover, grout in baths or showers, or other high humidity environments, is susceptible to mold and mildew which are difficult to clean. Scrubbing brushes aid the cleaning of grout but are very tedious in function, as each grout line has to be scrubbed individually. The spacing between grout lines is a function of tile size, which can vary greatly. A brush with multiple heads at a fixed position may only be useful for one specific application due to the variance in spacing between grout lines or other contours of the cleaning surface. Additionally, a handle having a single size and geometry may not be suited for a variety of users.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0003] FIG. 1 is an exploded view of the cleaning device showing an embodiment with a removable handle.

[0004] FIG. 2 is a side view of the cleaning device shown in FIG. 1.

[0005] FIG. 3 is an exploded view of the cleaning device showing an embodiment with a cylindrical flange.

[0006] FIG. 4 is a side view of the cleaning device shown in FIG. 3.

[0007] FIG. 5 is a front view of the cleaning device showing an embodiment with a head having an increased width.

[0008] FIG. 6 is a side view of the cleaning device shown in FIG. 5.

[0009] FIG. 7 is a front view of the cleaning device showing an embodiment with a head having an increased width and a cylindrical flange.

[0010] FIG. 8 is a side view of the cleaning device shown in FIG. 7.

[0011] FIG. 9 is a front view of the cleaning device showing an embodiment with a rigid assembly including a handle structurally integrated into a flange.

[0012] FIG. 10 is a side view of the cleaning device shown in FIG. 9.

[0013] FIG. 11 is a front view of the cleaning device showing an embodiment with a rigid assembly including a handle structurally integrated into a cylindrical flange.

[0014] FIG. 12 is a side view of the cleaning device shown in FIG. 11.

[0015] FIG. 13 is a front view of the cleaning device showing an embodiment with a head having a different geometry.

[0016] FIG. 14 is a side view of the cleaning device shown in FIG. 13.

[0017] FIG. 15 is a front view of the cleaning device showing an embodiment with a head having a different geometry and a cylindrical flange.

[0018] FIG. 16 is a side view of the cleaning device shown in FIG. 15.

[0019] FIG. 17 is a front view of the cleaning device showing an embodiment with a flange having a polygonal cross-section.

[0020] FIG. 18 is a side view of the cleaning device shown in FIG. 17.

[0021] FIGS. 1-18 are drawn approximately to scale.

### DETAILED DESCRIPTION

[0022] A cleaning device including a body that allows multiple adjustable attachments for cleaning applications is provided herein. The cleaning device may accommodate a variety of attachments such as brush heads, sponges, squeegees, etc., to clean a wide variety of surfaces, including grout between tiled surfaces. A cleaning device with multiple brush heads allows several lines of grout to be cleaned simultaneously. Customizable spacing of brush heads allows for the cleaning of varying widths of grout lines or other surfaces.

[0023] The cleaning device includes attachments mounted to a body including at least two parts: a handle and a flange. In one embodiment, the handle may be removably coupled to the flange. In this way, the device can accommodate a variety of handles which can be selected by the user for different cleaning surfaces and/or based on size and shape of the user's hand. Further in some embodiments, the body may additionally include a head positioned between the flange and the handle. The head may be shaped to provide a desired amount of structural support to the flange. For instance, the head may extend to lateral sides of the flange to provide increased flange support. Further in some embodiments, a cross-sectional geometry of the flange may be circular to enable radial adjustment of the attachments, facilitating additional modification of the cleaning device for different cleaning surface.

[0024] It is understood that while various embodiments of a cleaning device are illustrated and described below, the present disclosure is not limited to the specific forms or arrangements of parts and/or design elements herein described and shown, as numerous variations are within the scope of this disclosure.

[0025] Referring to FIG. 1, the cleaning device 10 includes a handle 12 and a flange 14. The handle 12 may be a hollow tube or may have a solid construction. An exploded view of the cleaning device 10 is depicted in FIG. 1. It will be appreciated that the flange 14 may be removably coupled (e.g., attached) to the handle 12 via an attachment interface 16. The attachment interface 16 includes a male threaded section 18 of the handle 12 mated with a female threaded section 20 of the flange 14. Therefore, when mated the female threaded section 20 encloses the male threaded section 18. Additional or alternative attachment interfaces have been contemplated such as screws, clamps, clips, etc.

[0026] A plurality of brush assemblies 22 are removably coupled to the flange 14. In other examples, additional or alternative attachment assemblies may be removably coupled to the flange such as sponge assemblies, squeegee assemblies, etc. Each of the brush assemblies 22 includes a brush body 24, brush bristles 25, and a thumb screw 26. The brush bristles 25 are attached to the brush body 24. The brush body 24 and brush bristles 25 may generally be referred to as cleaning elements. Other suitable cleaning elements such as sponge

bodies and sponges as well as squeegee bodies and squeegees may be included in the cleaning device, in some examples. Additionally, each of the brush assemblies may be independently slideable relative to the flange to provide lateral movement along the flange. A lateral axis is provided for reference.

[0027] The thumb screw 26 may extend through a threaded hole in the brush body 24 and releasably secure the brush assembly at a fixed location along the flange 14. Specifically, the thumb screw is configured to move in an axial direction in response to rotational input. In this way, the position (e.g., lateral position) of the brush assemblies relative to the flange 14 may be adjusted by a user of the cleaning device. As a result, the configuration of the cleaning device may be adjusted for a variety of cleaning surfaces, increasing the device's adaptability. Additional or alternative fastening elements may be used in the cleaning device to secure the attachment assemblies at fixed locations along the flange. Example fastening elements may include spring loaded shafts, clips, etc. Furthermore, other attachments such as sponges and squeegees may also be coupled to the flange 14, in other embodiments.

[0028] FIG. 2 shows a side view of the cleaning device 10 including the handle 12 and the flange 14 shown in FIG. 1. Additionally, one of the brush assemblies 22 is shown attached to the flange 14. The flange 14 has a substantially rectangular lateral cross-section, in the depicted embodiment. Thus, the flange 14 includes a plurality of sides 200. Adjacent sides are arranged perpendicular to one another. However, other cross-sectional geometries have been contemplated. Furthermore, the flange 14 includes concave notches 202 in face sharing contact with portions of the brush body 24. The notches enable the brush assemblies to slide along the flange when the thumb screw 26 is not engaged with the flange 14.

[0029] FIG. 3 shows another embodiment of the cleaning device 10 including the handle 12 removably coupled to the flange 14. The cleaning device 10 further includes the brush assemblies 22 removably coupled to the flange 14 via attachment interface 16, as discussed above with regard to FIG. 1. Furthermore, the brush assemblies each include a brush body and brush bristles, as discussed above. However, alternative or additional attachment assemblies may be used in other embodiments. Additionally, the flange 14 depicted in FIG. 3 has a cylindrical shape which enables greater adjustment of the relative position of the flange 14 and the brush assemblies 22.

[0030] FIG. 4 shows a side view of the embodiment of the cleaning device 10 shown in FIG. 3. The flange 14 has a continuously curved exterior surface. Specifically as illustrated in FIG. 3, the flange 14 has a circular lateral cross-section. However, other continuously curved cross-sectional flange geometries have been contemplated. For instance, the flange may have an oval cross-sectional geometry. The radius of the cross-section is constant along the lateral length of the flange 14. Thus, the flange has a cylindrical exterior surface 402. The cylindrical flange enables the brush assemblies to be positioned at different radial positions with regard to an axis 400 of the cylindrical flange 14. In this way, the position of the brush assemblies may be adjusted for a variety of cleaning surfaces, increasing the cleaning device's adaptability. Additionally, an end of the thumb screw 26 in the brush assemblies may be pointed or curved to substantially inhibit movement of the brush assembly 22 relative to the flange 14.

[0031] The exterior surface 402 of the flange 14 is mated with interior surfaces 404 of the brush assemblies 22. There-

fore, the interior surfaces 404 at least partially enclose a portion of the flange 14. Specifically in one example, the exterior surface 402 is in face-sharing contact with the interior surfaces 404.

[0032] FIG. 5 shows another embodiment of the cleaning device 10. The cleaning device 10 includes the handle 12, the flange 14, and a head 500 positioned between the handle and the flange. All three components are contiguous and structurally integrated, creating a single rigid structure. Therefore, the handle 12 is coupled to the flange 14 and the flange 14 is coupled to the head 500. The flange 30 connects the handle 12 with the head 500. The head 500 laterally extends to a first lateral side 502 and a second lateral side 504 of the flange 14, providing increased flange support. The second lateral side 504 opposes the first lateral side 502. Consequently, the likelihood of the flange fracturing from the head is reduced, thereby increasing the durability of the device. A lateral axis is provided for reference. Again, the plurality of brush assemblies 22 are removably coupled to the flange 14. Additionally, peripheral sides 506 of the head 500 are curved.

[0033] In the example depicted in FIG. 5, the handle 12 is indirectly coupled to the flange 14 via the head 500. However, in other examples the handle may be directly coupled to the flange with no intervening components positioned therebetween. Further in one example, the handle may be directly and removably coupled to the head, and the head may be directly and permanently connected to the flange.

[0034] FIG. 6 shows a side view of the embodiment of the cleaning device 10 shown in FIG. 5. As illustrated, the geometries of the flanges shown in FIG. 6 and FIG. 2 are substantially identical.

[0035] FIG. 7 shows another embodiment of the cleaning device 10. The head 500 shown in FIG. 7 is substantially identical in geometry to the head shown in FIG. 5. Additionally, the flange 14 shown in FIG. 7 is substantially identical in geometry to the flange shown in FIGS. 3 and 4. However, in FIG. 7 a portion of the head 500 coupled to the flange 14 may be shaped to attach to the cylindrical shaped flange 14. Again, the plurality of brush assemblies 22 are removably coupled to the flange 14.

[0036] FIG. 8 shows a side view of the embodiment of the cleaning device 10 shown in FIG. 7. As illustrated, the flange 14 in FIG. 8 is substantially identical in geometry to the flange 14 shown in FIG. 4. Therefore, the flange 14 shown in FIG. 8 has a circular lateral cross-section and is cylindrical in shape.

[0037] FIGS. 9 and 10 show another embodiment of the cleaning device 10. The cleaning device 10 includes the flange 14 fixedly coupled to the handle 12. Therefore, the flange 14 and the handle 12 are contiguous and structurally integrated in the embodiment depicted in FIGS. 9 and 10. Furthermore, the flange 14 shown in FIGS. 9 and 10 is substantially identical in geometry to the flange shown in FIGS. 1 and 2.

[0038] FIGS. 11 and 12 show another embodiment of the cleaning device 10. The cleaning device 10 includes the flange 14 fixedly coupled to the handle 12. The geometry of the handle 12 shown in FIGS. 11 and 12 is substantially identical to the geometry of the handle 12 shown in FIGS. 9 and 10. Additionally, the geometry of the flange 14 shown in FIGS. 11 and 12 is substantially identical to the geometry of the flange shown in FIGS. 3 and 4.

[0039] FIGS. 13 and 14 show another embodiment of the cleaning device 10. The head 500 extends to lateral sides 1300 of the flange 14. A lateral axis is provided for reference.

Therefore, the attachment interface between the head and the flange extends from one side of the flange to another side of the flange. Additionally, peripheral sides **1302** of the head **500** are straight. The flange **14** shown in FIGS. **13** and **14** is substantially identical to the flange shown in FIGS. **1** and **2**. [0040] FIGS. **15** and **16** show another embodiment of the cleaning device **10**. The head **500** of the cleaning device shown in FIGS. **15** and **16** is substantially identical in geometry to the head **500** of the cleaning device **10** shown in FIG. **13**. However, it will be appreciated that in FIGS. **15** and **16** a section of the head **500** is shaped to attach to the cylindrical flange **14**. Additionally, the flange **14** shown in FIGS. **15** and **16** is substantially identical in geometry to the flange **14** shown in FIGS. **1** and **2**.

[0041] FIGS. **17** and **18** show another embodiment of the cleaning device **10**. Again, the cleaning device **10** includes the handle **12**, the head **500**, and the flange **14**. As shown, the brush assemblies **22** are mated with the flange **14**. Furthermore, a lateral cross-section of the flange **14** is triangular as shown in FIG. **18**. Therefore, adjacent sides **1800** of the flange **14** intersect at non-straight angles. The adjacent sides **1800** are planar surfaces, in the depicted embodiment. Therefore in another example the cleaning device may include at least three planar exterior surfaces that collectively form an exterior surface with a polygonal cross section. Furthermore, each interior surface **1802** of the plurality of brush assemblies **22** at least partially encloses a portion of the flange **14**, in the example depicted in FIG. **18**.

[0042] While specific embodiments of the cleaning device have been described in detail, the particular arrangements disclosed are meant to be illustrative only and not limiting. The features of the various embodiments described above, as well as modifications thereof, may be variously combined without departing from the scope of this disclosure.

1. A cleaning device comprising:
  - a handle;
  - a flange coupled to the handle, the flange having a cylindrical exterior surface; and
  - a plurality of attachment assemblies, each of the plurality of attachment assemblies:
    - including a cleaning element;
    - having an interior surface that mates with the exterior surface of the flange;
    - being independently slideable relative to the flange to provide lateral movement along the flange; and
    - including a fastening element configured to secure the attachment assembly at a fixed location along the flange.
2. The cleaning device of claim 1, where the fastening element is a thumb screw configured to move in an axial direction in response to rotational input.
3. The cleaning device of claim 1, where the handle is removably attached to the flange.
4. The cleaning device of claim 1, where the cylindrical exterior surface is in face-sharing contact with the interior surfaces of the plurality of attachment assemblies.
5. The cleaning device of claim 1, further comprising a head, and wherein the handle is indirectly coupled to the flange via the head, the handle is directly and removably coupled to the head, and the head is directly and permanently connected to the flange.
6. The cleaning device of claim 5, where the head extends from a first lateral side of the flange to a second lateral side of the flange opposing the first lateral side.

7. The cleaning device of claim 5, where peripheral sides of the head are curved.

8. The cleaning device of claim 1, where the cleaning element includes brush bristles attached to a brush body.

9. A cleaning device comprising:

- a handle;
- a flange coupled to the handle, the flange having a continuously curved exterior surface; and
- a plurality of attachment assemblies, each of the plurality of attachment assemblies:
  - including a cleaning element;
  - having an interior surface that mates with the three planar exterior surfaces of the flange;
  - being independently slideable relative to the flange to provide lateral movement along the flange; and
  - including a fastening element configured to secure the attachment assembly at a fixed location along the flange.

10. The cleaning device of claim 9, where the flange has a circular cross-section.

11. The cleaning device of claim 9, where the handle is removably attached to the flange.

12. The cleaning device of claim 9, further comprising a head, and wherein the handle is indirectly coupled to the flange via the head, the handle is directly and removably coupled to the head, and the head is directly and permanently connected to the flange.

13. The cleaning device of claim 12, where peripheral sides of the head are straight.

14. The cleaning device of claim 9, where the cleaning element includes brush bristles attached to a brush body.

15. A cleaning device comprising:

- a handle;
- a flange coupled to the handle, the flange having at least three planar exterior surfaces that collectively form an exterior surface with a polygonal cross section; and
- a plurality of attachment assemblies, each of the plurality of attachment assemblies:
  - including a cleaning element,
  - having an interior surface that mates with the exterior surface of the flange,
  - being independently slideable relative to the flange to provide lateral movement along the flange, and
  - including a fastening element configured to secure the attachment assembly at a fixed location along the flange.

16. The cleaning device of claim 15, where the cleaning element includes brush bristles attached to a brush body.

17. The cleaning device of claim 15, where the handle is removably attached to the flange.

18. The cleaning device of claim 15, further comprising a head, and wherein the handle is indirectly coupled to the flange via the head, the handle is directly and removably coupled to the head, and the head is directly and permanently connected to the flange.

19. The cleaning device of claim 18, where the flange extends from a first lateral side of the flange to a second lateral side of the flange opposing the first lateral side.

20. The cleaning device of claim 15, where each interior surface of the plurality of attachment assemblies at least partially encloses a portion of the flange.