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(54) **GROUT CLEANING TOOL**

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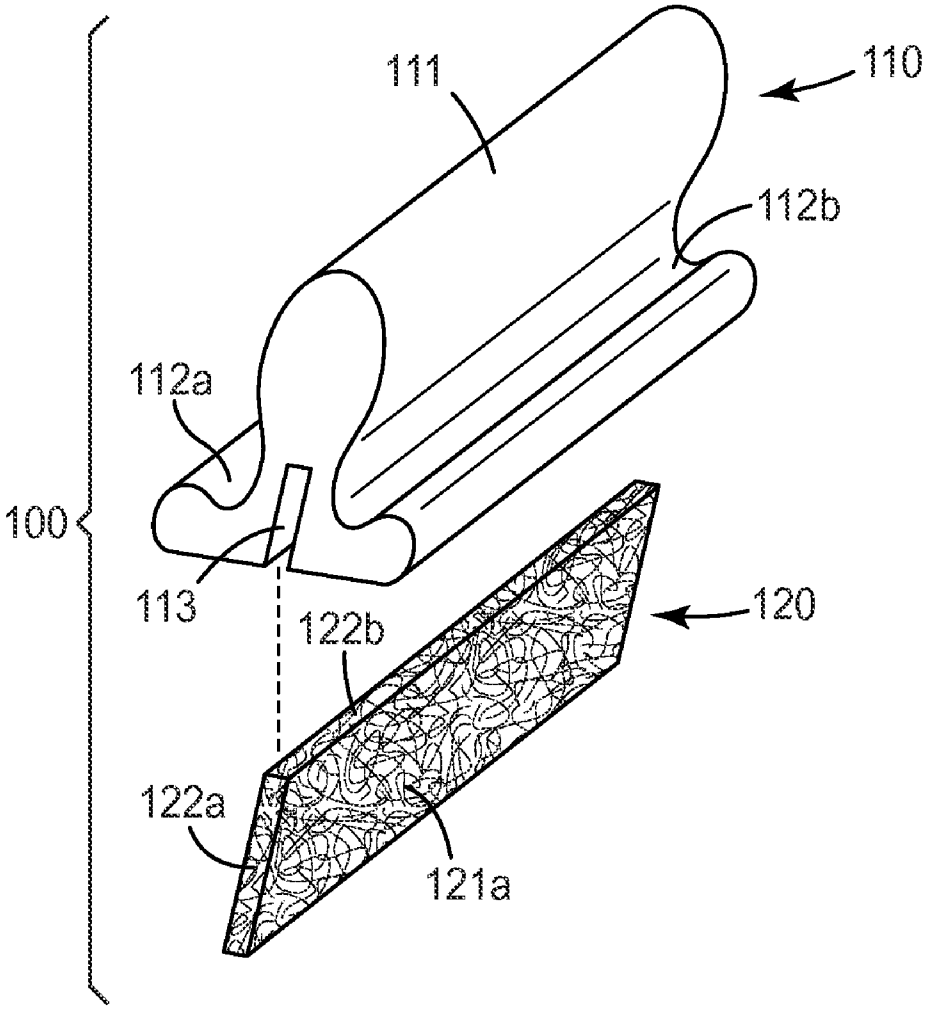
(57) **ABSTRACT**

A tool for cleaning grout including a nonwoven web, or nonwoven web composite, having two opposing major surfaces and at least three edge surfaces defined by the opposing major surfaces, wherein the web or web composite is secured in a slot of a grip such as a handgrip. The web or web composite extends from the grip such that the edges of the web or web composite are available for scrubbing. The nonwoven web or web composite may have three or four edge surfaces. Kits including a plurality of nonwoven webs or web composites, in combination with a grip, may be made.



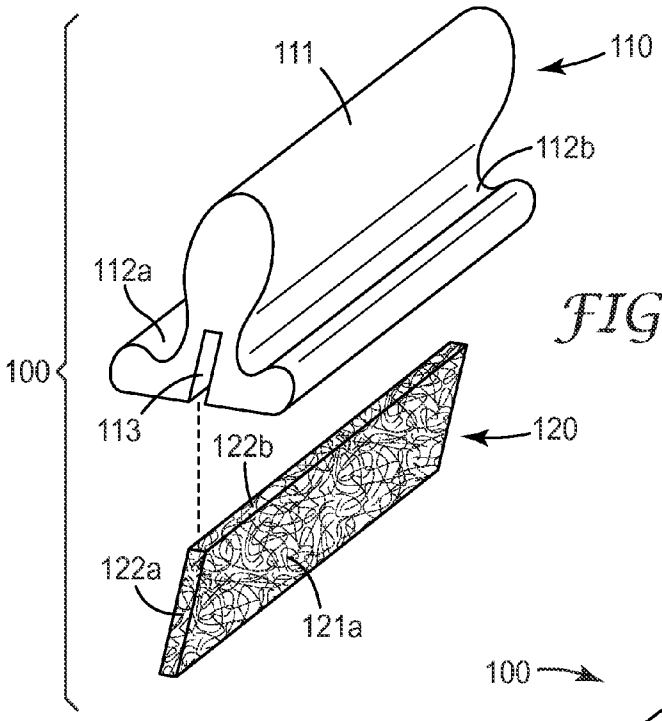


FIG. 1a

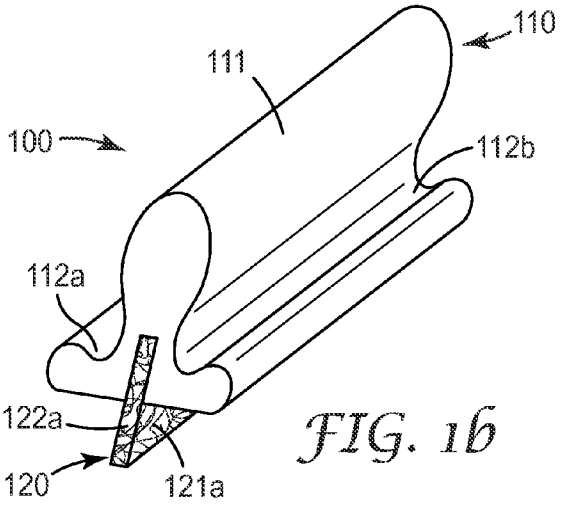


FIG. 1b

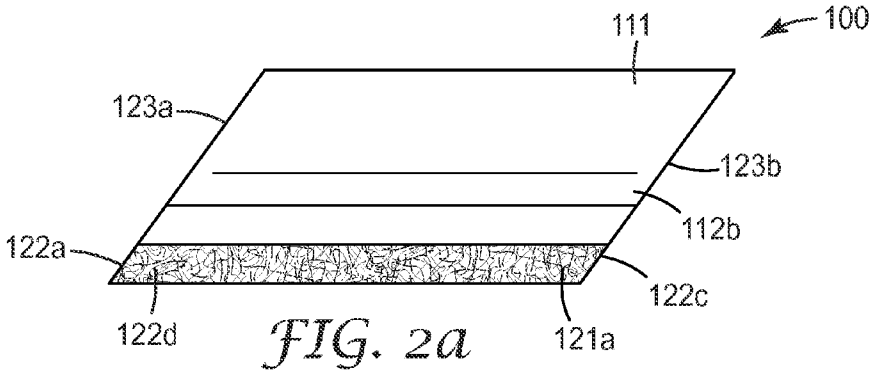


FIG. 2a

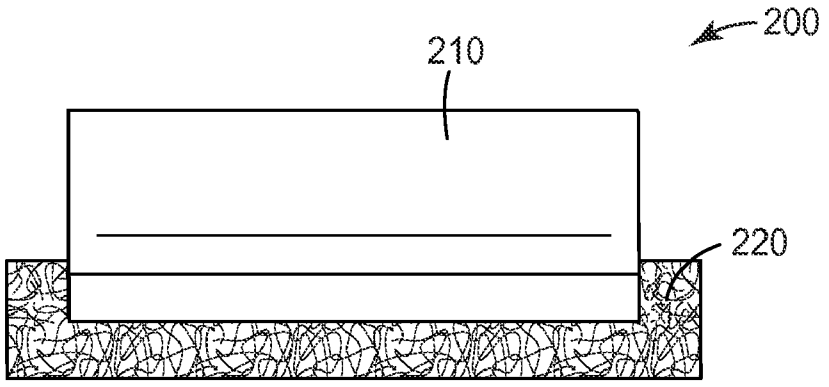


FIG. 2b

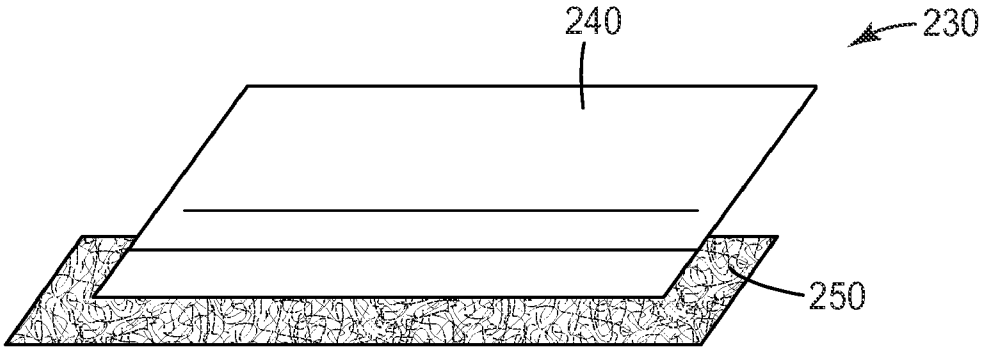


FIG. 2c

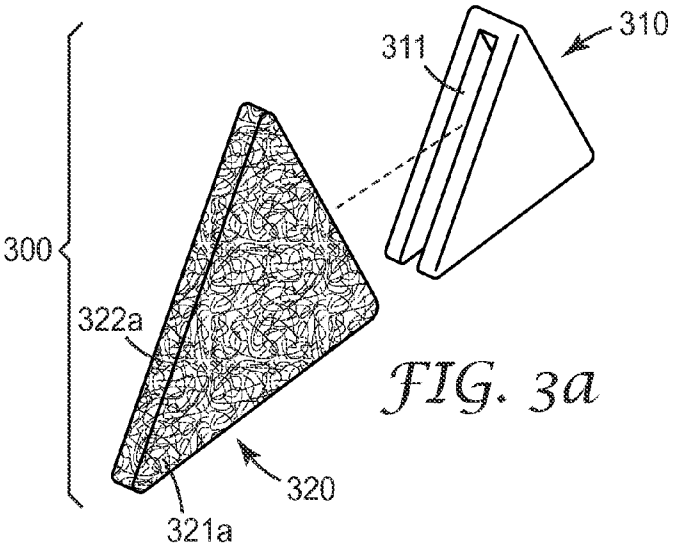


FIG. 3a

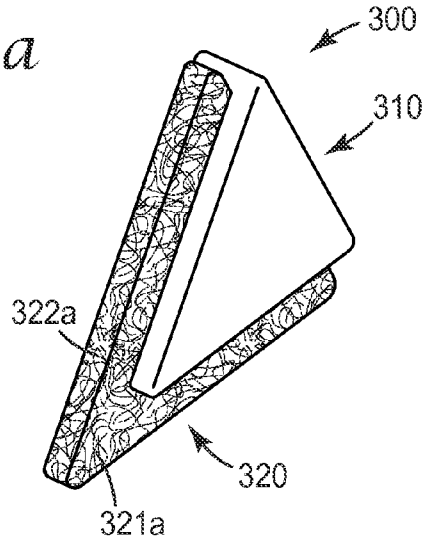


FIG. 3b

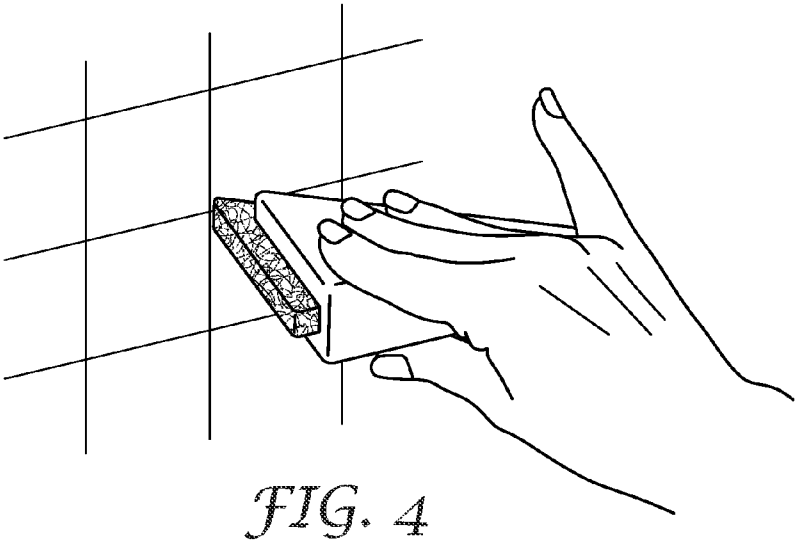


FIG. 4

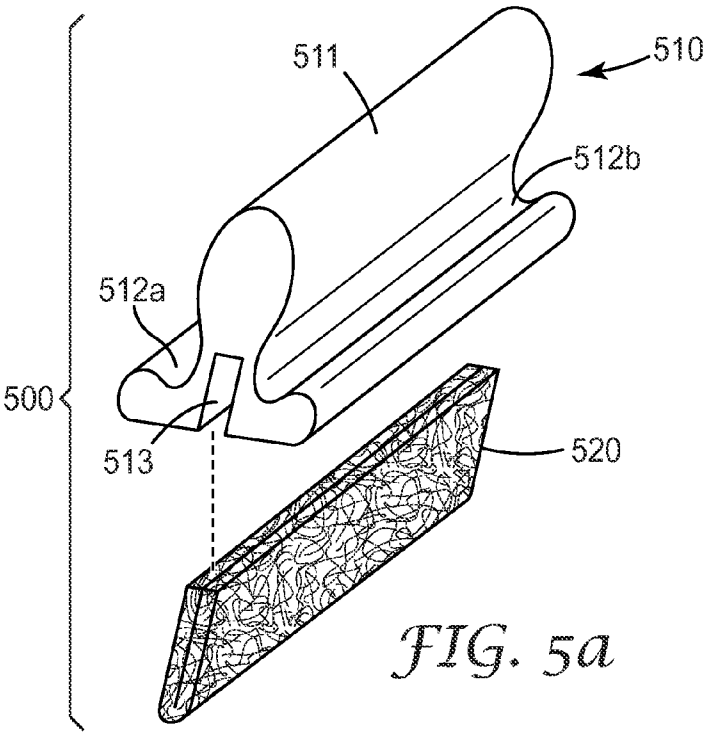


FIG. 5a

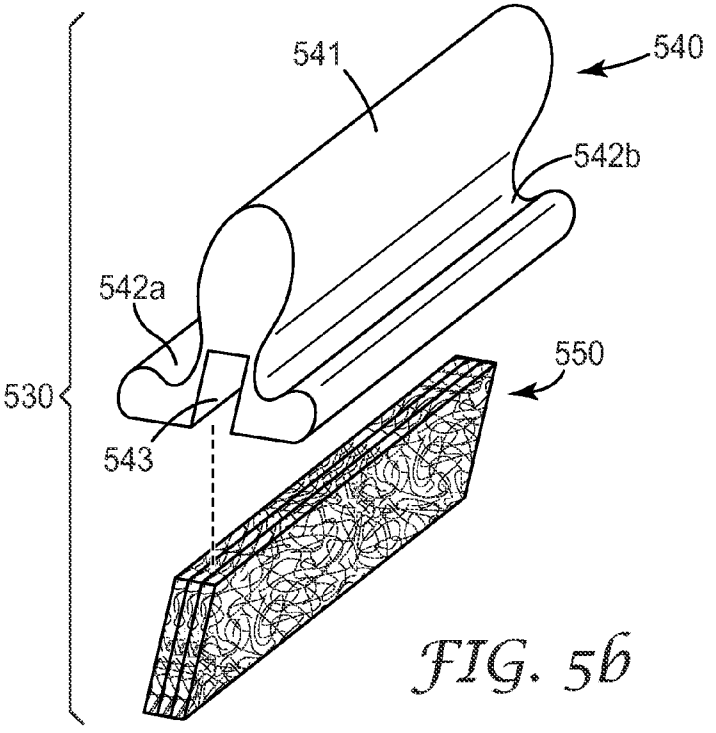


FIG. 5b

GROUT CLEANING TOOL

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Application No. 61/187,173 (Benson), filed Jun. 15, 2009, the disclosure of which is incorporated herein by reference.

FIELD

[0002] This disclosure generally relates to cleaning tools and particularly to hand-held, manually-operated cleaning tools for cleaning grouted joints.

BACKGROUND

[0003] Grout is a construction material often used to seal joints. For example, grout can be used to seal joints between tiles to keep out water, prevent edges of tiles from chipping and cracking, and to give tiled surfaces a finished look. Grout is also used to seal joints between a faucet assembly and the surface of a sink to keep out water and to hold the faucet assembly in place. In many applications, grout forms long narrow concavities between items that are sealed together, and these concavities can be difficult to clean if they become stained, moldy or filled with debris. Typical sponges and pads are not ideal for cleaning such long narrow concavities because they have large surface areas that are not easily conformable to such narrow shapes.

SUMMARY

[0004] These and other aspects of the invention are described in more detail below. The above summary is not intended to limit the claimed subject matter in any way.

BRIEF DESCRIPTIONS OF DRAWINGS

[0005] The figures are drawings of exemplary articles disclosed herein. The drawings are not necessarily to scale.

[0006] FIGS. **1***a* and **1***b* show perspective views of an exemplary grout cleaning tool.

[0007] FIG. **2***a* shows a side view of the exemplary grout cleaning tool shown in FIGS. **1***a* and **1***b*.

[0008] FIGS. **2***b* and **2***c* show side views of exemplary grout cleaning tools.

[0009] FIGS. **3***a* and **3***b* show perspective views of another exemplary grout cleaning tool.

[0010] FIG. **4** shows exemplary use of the exemplary grout cleaning tool shown in FIGS. **3***a* and **3***b*.

[0011] FIGS. **5***a* and **5***b* show perspective views of exemplary grout cleaning tools.

[0012] While the above-identified drawings and figures set forth embodiments of the invention, other embodiments are also contemplated, as noted in the discussion. In all cases, this disclosure presents the invention by way of representation and not limitation. It should be understood that numerous other modifications and embodiments can be devised by those skilled in the art, which fall within the scope and spirit of this invention.

DETAILED DESCRIPTION

[0013] FIG. **1***a* shows a perspective view of exemplary grout cleaning tool **100**. The tool comprises grip **110** and nonwoven web **120**. The web comprises two opposing major surfaces **121***a* and **121***b* (not shown), and these opposing surfaces define four edge surfaces **122***a*, **122***b*, **122***c* (not shown) opposing edge surface **122***a*, and **122***d* (not shown) opposing edge surface **122***b*. Grip **110** comprises grip portion **111** and two ledges **112***a* and **112***b* disposed on opposing sides of the grip portion. In general, the grip portion facilitates gripping, and the ledges provide finger protection. Grip **110** comprises slot **113** for receiving a portion of the nonwoven web and when inserted, as shown in FIG. **1***b*, the grip does not completely cover the web. In general, for a side view of the tool, the web extends from the slot to beyond the perimeter of the grip such that portions of major surfaces **122***a* and **122***b* are viewable below the grip. The web may or may not be viewable at the sides of the grip.

[0014] FIG. **2***a* shows a side view of grout cleaning tool **100**. In this embodiment, for a side view of the tool, the web is about as wide as the grip such that the web is viewable below the grip but not at the sides of the grip. Tool **100** has a trapezoidal shape as viewed from the side as shown in FIG. **2***a*, which can facilitate cleaning because a user can see the front portion of the web along edge surface **122***a*. In general, useful trapezoidal shapes have an acute angle of from about 40 to about 65 degrees.

[0015] FIGS. **2***b* and **2***c* show side views of exemplary grout cleaning tools. In FIG. **2***b*, exemplary grout cleaning tool **200** comprises grip **210** and nonwoven web **220**, wherein the web is longer than the grip, and both the grip and the web have a rectangular shape. In FIG. **2***c*, exemplary grout cleaning tool **230** comprises grip **240** and nonwoven web **250**, wherein the web is longer than the grip, and both the grip and the web have a trapezoidal shape.

[0016] In general, the grip is suitable for gripping by hand. The grip may make the grout cleaning tool stiffer as compared to the stiffness of the nonwoven web. The grip may or may not be stiffer than the nonwoven web. The grip may be anywhere from hard and rigid to soft and flexible, depending on the design of the particular tool, e.g., a tool with a harder more rigid grip may require less work to use as compared to a tool with a soft and flexible grip.

[0017] The grip may comprise porous and/or nonporous materials. Exemplary nonporous materials include natural and synthetic polymers. Exemplary porous materials include natural and synthetic foams, sponges, and polymers. Porous materials may have an open or closed cell structure and/or small or large pores. Sponges include natural sponges and cellulose-based sponges including those which are derived from plant or animal products.

[0018] Any polymer known to be used for grips may be used, including porous rubber, silicon, melamine or post treated impregnated foams, foamed polyester, cellulose materials, low and high density polyethers and polyesters, neoprene, natural rubber, styrene-butadiene rubbers, ethylene-propylene rubbers, butyl rubbers, butadiene rubbers, nitrile rubbers, epichlorohydrin-based polymers, polystyrenes, polyolefins such as polyethylene and polypropylene, ethylene vinyl acetate, EMA, metallocene resin, polyurethane, polyvinylchloride, flame retardant polymers, blends of any of the above, and the like.

[0019] The properties of the nonwoven web may vary, depending on the intended application, use, etc. The nonwoven web may be stiff or drapable, open and porous, dense and substantially nonporous, and/or hard or soft. In some cases, as described below for the embodiment shown in FIG. **5***a*, the nonwoven web is flexible enough so that it can be

folded back onto itself. The nonwoven web comprises fibers which may be polymeric and/or metal fibers. Polymeric fibers are typically made from thermoplastic polymers including polyolefins such as polyethylene, polypropylene, and polybutylene; polyamides such as nylon 6, nylon 6/6, and nylon 10); polyesters such as polyethylene terephthalate; copolymers containing (meth)acrylic monomers; and blends and copolymers thereof. Semi-synthetic fibers such as acetate fibers; natural fibers such as cotton fibers, looflah (a cellularly structured material made from the fruit of the Luffa acutangula plant); regenerated fibers such as rayon fibers, and other non-thermoplastic fibers can be blended with the thermoplastic fibers. One example of a nonwoven web is a scrub pad sold under the tradename SCOTCHBRITE from 3M™ Company. The nonwoven web may comprise a foam made from a polyolefin such as polyethylene; melamine; or polyurethane. The nonwoven web may comprise a rubber eraser-like material having abrasive particles embedded into the material.

[0020] The nonwoven web may comprise more than one layer of material such that the faces of the web have different properties. For example, a nonwoven web may comprise a synthetic foam on one face, and porous polymer on the other.

[0021] The nonwoven web can be prepared by any suitable melt forming or mechanical forming operation. For example, the nonwoven may be carded, spunbonded, spunlaced, melt blown, air laid, creped, or made by other processes as are known in the art. The nonwoven can be consolidated by any known technique such as for example hydroentanglement, thermal bonding (e.g. calendar or through air) chemical bonding, needlepunching/needletacking, use of binder fibers, etc. The fibers typically have a denier of from about 1 to about 3000, or from about 1 to about 50. The basis weight of the nonwoven web may be from about 10 to about 500 grams per square meter, from 50 to about 350 grams per square meter, or less than 100 grams per square meter.

[0022] In some embodiments, the grip comprises an extruded closed cell foam, and the nonwoven web comprises a replaceable heavy duty web sheet.

[0023] In general, the nonwoven web is secured to the grip by inserting the web into the slot. The slot may comprise protrusions such as pins that extend inward from the sides of the slot. Spokes, hinges, and pieces that snap together may be used to secure the web to the grip. The slot may have features for securing the web wherein the features penetrate through the web. The nonwoven web may be removably secured to the grip such that a different edge of the web can be used, or the web replaced with a new or different web. The nonwoven web may not be removably secured to the grip, rather, it may be permanently secured to the grip. The web may be glued to the grip or the web and grip materials may be coextruded.

[0024] The slot needs to have a height large enough such that sufficient hold of the nonwoven web can be obtained. In some embodiments, the grip may cover at least half of the surface area of each opposing major surface.

[0025] In general, the grout cleaning tool may be provided in any useful overall size and shape such as a square shape. For example, the length of the grip may be anywhere from about 2 to about 30 cm, the width may be from about 2 to about 10 cm, and the height may be from about 2 to about 10 cm. The slot may have a length that is the same or nearly the same as that of the grip, or from about 2 to about 30 cm, or it may be longer or shorter than the grip. The slot may have a width of from about 0.5 to about 5 cm, and a height of from about 1 to about 5 cm. The nonwoven web may have a length that is the same or nearly the same as that of the grip, or from about 2 to about 30 cm, or it may be longer or shorter than the grip. The nonwoven web may have a height such that from about 5 to about 15 cm extends beyond the perimeter of the grip.

[0026] FIG. **3***a* shows a perspective view of exemplary grout cleaning tool **300**. The tool comprises grip **310** and nonwoven web **320**. The web comprises two opposing major surfaces **321***a* and **321***b* (not shown), and these opposing surfaces define three edge surfaces **322***a*, **322***b* (not shown, counterclockwise from **322***a*) and **322***c* (not shown, counterclockwise from **322***b*). Grip **310** comprises slot **311** for receiving a portion of the nonwoven web and when inserted, as shown in FIG. **3***b*, the web extends beyond the perimeter of the grip when viewed from the side, i.e., the slot receives the web, but does not completely cover the web. When viewed from the side, the perimeter of grip **310** comprises an isosceles triangle. In some embodiments, the perimeter may comprise a triangle having two sides of equal length, and the third side a different length. In some embodiments, the perimeter may comprise a triangle having three sides, each side having a different length. FIG. **4** shows exemplary use of grout cleaning tool **300**.

[0027] The perimeter of grout cleaning tool **300** is such that when viewed from above, a user can see where and how the nonwoven web is contacting the cavity, surface, etc. to be cleaned. Grout cleaning tool **300** may be provided in any useful overall size. For a tool having a nonwoven web inserted into the grip, the sides may each have a length of from about 40 to about 60 cm, e.g., the sides may each have a length of about 50 cm. The width of the grip may be from about 5 to about 20 cm. The width of the nonwoven web is less than that of the grip. Opposing major surfaces **321***a* and **321***b* of the nonwoven web may have any surface area relative to the grip, e.g., the opposing surfaces may have the same surface area as the grip, or the surface area may be larger than that of the grip. The nonwoven web may be positioned such that opposing major surfaces **321***a* and **321***b* extend beyond the perimeter of the grip by about 2 to about 10 cm.

[0028] FIG. **5***a* shows a perspective view of exemplary grout cleaning tool **500**. The tool comprises grip **510** having grip portion **511** and two ledges **512***a* and **512***b* disposed on opposing sides of the grip portion. In general, the grip portion facilitates gripping, and the ledges provide finger protection. Grip **510** comprises slot **513** for receiving a portion of nonwoven web composite **520** which is a nonwoven web folded back onto itself as shown in FIG. **5***a*. Nonwoven web composite is inserted in slot **513**, and as described above for grout cleaning tool **100**, the grip does not completely cover the web. Nonwoven web composite **520** extends from the slot to beyond the perimeter of the grip as described above for grout cleaning tool **100**, and the web composite may or may not be viewable at the sides of the grip when tool **500** is viewed from the side. The embodiment shown in FIG. **5***a* differs from the embodiment shown in FIGS. **1***a* and **1***b* in that the nonwoven web composite is folded back onto itself, increasing the thickness of the nonwoven web and providing a curved web composite surface available for use. The edge opposing the curved web composite surface may also be used. Slot **513** may have a larger width than slot **113**, for example, if the same nonwoven web is used.

[0029] FIG. **5***b* shows a perspective view of exemplary grout cleaning tool **530**. The tool comprises grip **540** having grip portion **541** and two ledges **542***a* and **542***b* disposed on

opposing sides of the grip portion. In general, the grip portion facilitates gripping, and the ledges provide finger protection. Grip **540** comprises slot **543** for receiving a portion of nonwoven web composite **550** which comprises three separate webs shown as a single web in FIG. **5***b*. Nonwoven web composite **550** is inserted in slot **543**, and as described above for grout cleaning tool **100**, the grip does not completely cover the web composite. Nonwoven web composite **550** extends from the slot to beyond the perimeter of the grip as described above for grout cleaning tool **100**, and the web composite may or may not be viewable at the sides of the grip when tool **530** is viewed from the side. The embodiment shown in FIG. **5***b* differs from the embodiment shown in FIGS. **1***a* and **1***b* in that the nonwoven web composite comprises three separate nonwoven webs. Slot **543** may have a larger width than slot **113**, for example, if the same nonwoven web is used for nonwoven web **120** and nonwoven web composite **550**. Three nonwoven webs may be used to provide a larger edge surface available for use. The nonwoven web composite is not limited to three separate nonwoven webs, but may comprise two nonwoven webs, or more than three webs. The separate nonwoven webs may be formed into the composite such that one, two, three or four edges of the composite comprise a substantially even surface. The edge surfaces intended for use may be substantially even, or one or both may be uneven depending on the intended use of the tool.

[0030] For the embodiments shown in FIGS. **5***a* and **5***b*, the nonwoven web composite may be formed with or without means for securing the webs together. If the webs are secured together, they can be secured using mechanical means or by an adhesive. Further, the webs may be secured permanently such that they cannot be separated easily by the user, or temporarily such that the user can readily reform the web composite by unfolding the web composite and refolding it, or by restacking the webs in a different order and/or orientation. In either case, temporarily secured webs may be employed to expose different edges available for use. If an adhesive is used, it may be a hot melt adhesive, or a curable adhesive such as a urethane adhesive or a two-part epoxy adhesive. The coating weight for the adhesive may be, for example, anywhere from about 1 to about 50 mil.

[0031] For each of the embodiments shown in FIGS. **1***a*-**1***b*, **2***a*-**2***c* and **5***a*-**5***b*, the grip may comprise a groove or concave feature along the top of the grip portion, for example, grip portion **111** as shown in FIGS. **1***a*-**1***b*. The concave feature could provide an area for positioning one or more fingers on the grip.

[0032] Kits comprising at least one of the nonwoven webs and/or web composites in combination with one or more grips may be made, typically for embodiments in which the webs or web composites are intended to be removed from the grip and replaced.

[0033] Although specific embodiments of this invention have been shown and described herein, it is understood that these embodiments are merely illustrative of the many possible specific arrangements that can be devised in application of the principles of the invention. Numerous and varied other arrangements can be devised in accordance with these principles by those of ordinary skill in the art without departing from the spirit and scope of the invention. Thus, the scope of the present invention should not be limited to the structures described in this application, but only by the structures described by the language of the claims and the equivalents of those structures.

What is claimed is:

1. A tool for cleaning grout, comprising:
- a nonwoven web having two opposing major surfaces and at least three edge surfaces defined by the opposing major surfaces, and
- a grip having a slot for receiving a portion of the nonwoven web,
- wherein the nonwoven web is inserted into the slot such that the web extends beyond the perimeter of the grip.

2. The tool of claim **1**, wherein the grip is a handgrip.

3. The tool of claim **1**, wherein the grip is porous.

4. The tool of claim **1**, wherein the nonwoven web is removably secured to the grip.

5. The tool of claim **1**, wherein the nonwoven web is permanently secured to the grip.

6. The tool of claim **1**, wherein the nonwoven web comprises thermoplastic polymeric fibers.

7. The tool of claim **1**, wherein the nonwoven web comprises natural fibers.

8. The tool of claim **1**, wherein the grip covers at least half of the surface area of each opposing major surface of the nonwoven web.

9. The tool of claim **1**, wherein the grip is stiffer than the nonwoven web.

10. The tool of claim **1**, wherein the two opposing major surfaces of the nonwoven web define four edge surfaces.

11. The tool of claim **10**, wherein for a side view of the tool, the perimeter of the tool has a trapezoidal shape.

12. The tool of claim **1**, wherein the two opposing major surfaces define three edge surfaces.

13. The tool of claim **12**, wherein for a side view of the tool, the perimeter of the tool has the shape of an isosceles triangle.

14. The tool of claim **1**, wherein the nonwoven web is folded back onto itself.

15. The tool of claim **1**, wherein the nonwoven web comprises a composite of a plurality of nonwoven webs arranged in a stacked configuration.

16. A kit comprising:
- at least one nonwoven web, the web having two opposing major surfaces and at least three edge surfaces defined by the opposing major surfaces, and
- a grip having a slot for receiving a portion of the nonwoven web, wherein the nonwoven web is inserted into the slot such that the web extends beyond the perimeter of the grip.

17. The kit of claim **16**, wherein the nonwoven web comprises a composite of a plurality of nonwoven webs arranged in a stacked configuration.

* * * * *