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(54) **LIQUID EXTRACTION APPARATUS AND METHOD**

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(57) **ABSTRACT**

An apparatus includes a body, a first tank and a second tank. The body includes a front side, a back side, a top side and a bottom side. The body also includes a first fluid output, a first air passage, a second air passage, and a third air passage. A nozzle is removably attached to the front side of the body. The nozzle includes a fourth air passage proximate the bottom side of the body and a fifth air passage proximate the top side of the body. The fifth air passage is communicatively coupled with the fourth air passage. The nozzle is attached to the body such that the first air passage and the fifth air passage are substantially aligned. The apparatus also includes a handle coupled with the body, a vacuum motor, a fluid pump and a controller configured to activate the fluid pump and/or the vacuum motor.

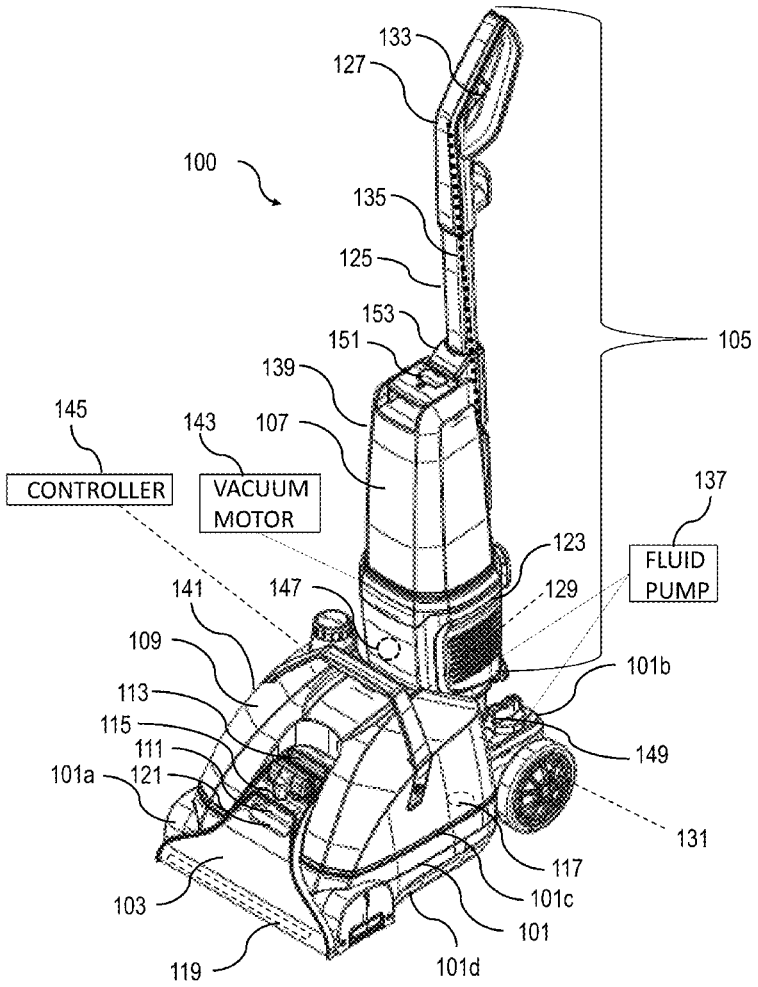


FIG. 1

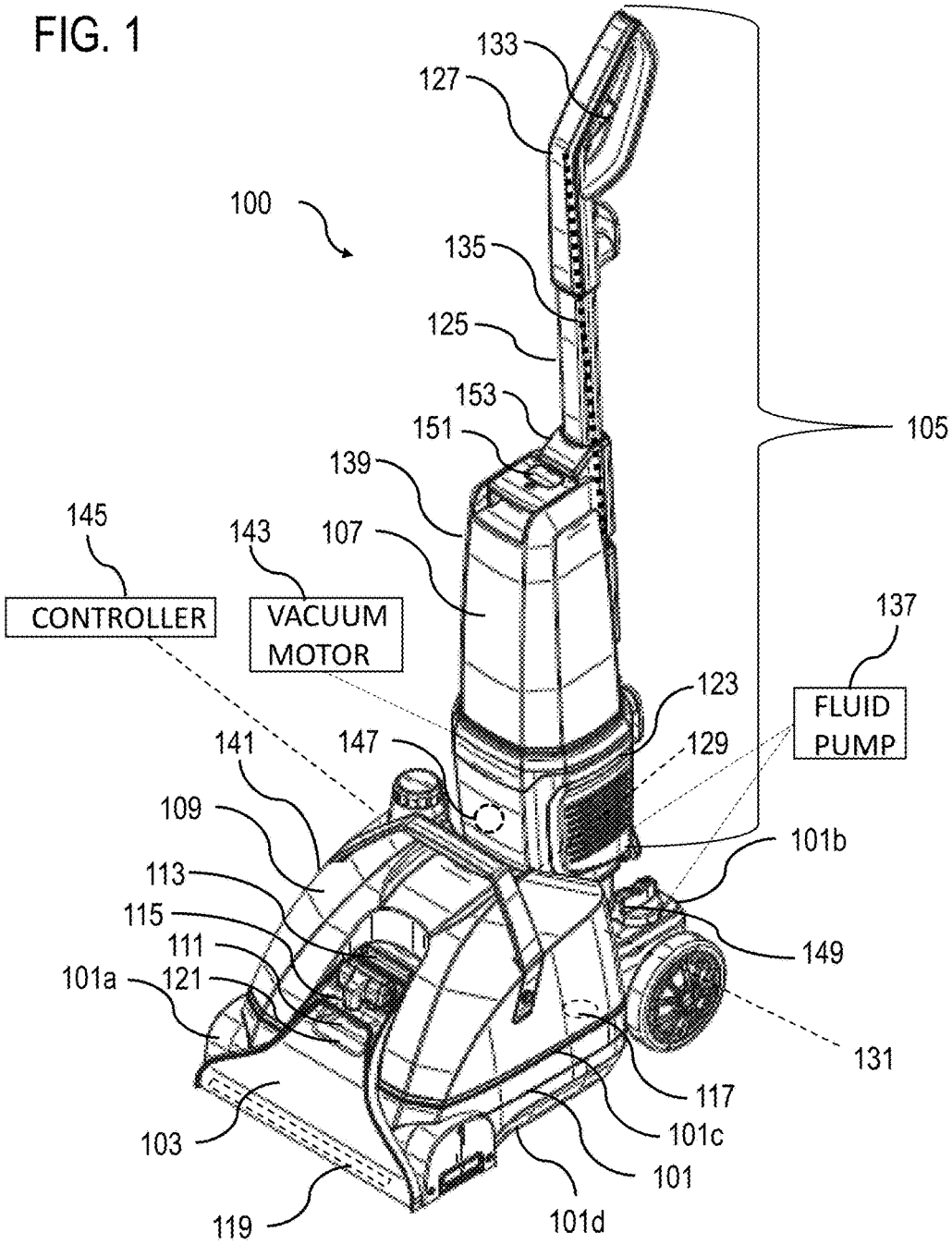

133
127
100
135
125
153
151
105
139
145
143
107
CONTROLLER
VACUUM MOTOR
137
FLUID PUMP
123
141
147
129
109
101b
113
115
111
149
101a
121
131
117
103
101c
101
119
101d

FIG. 2

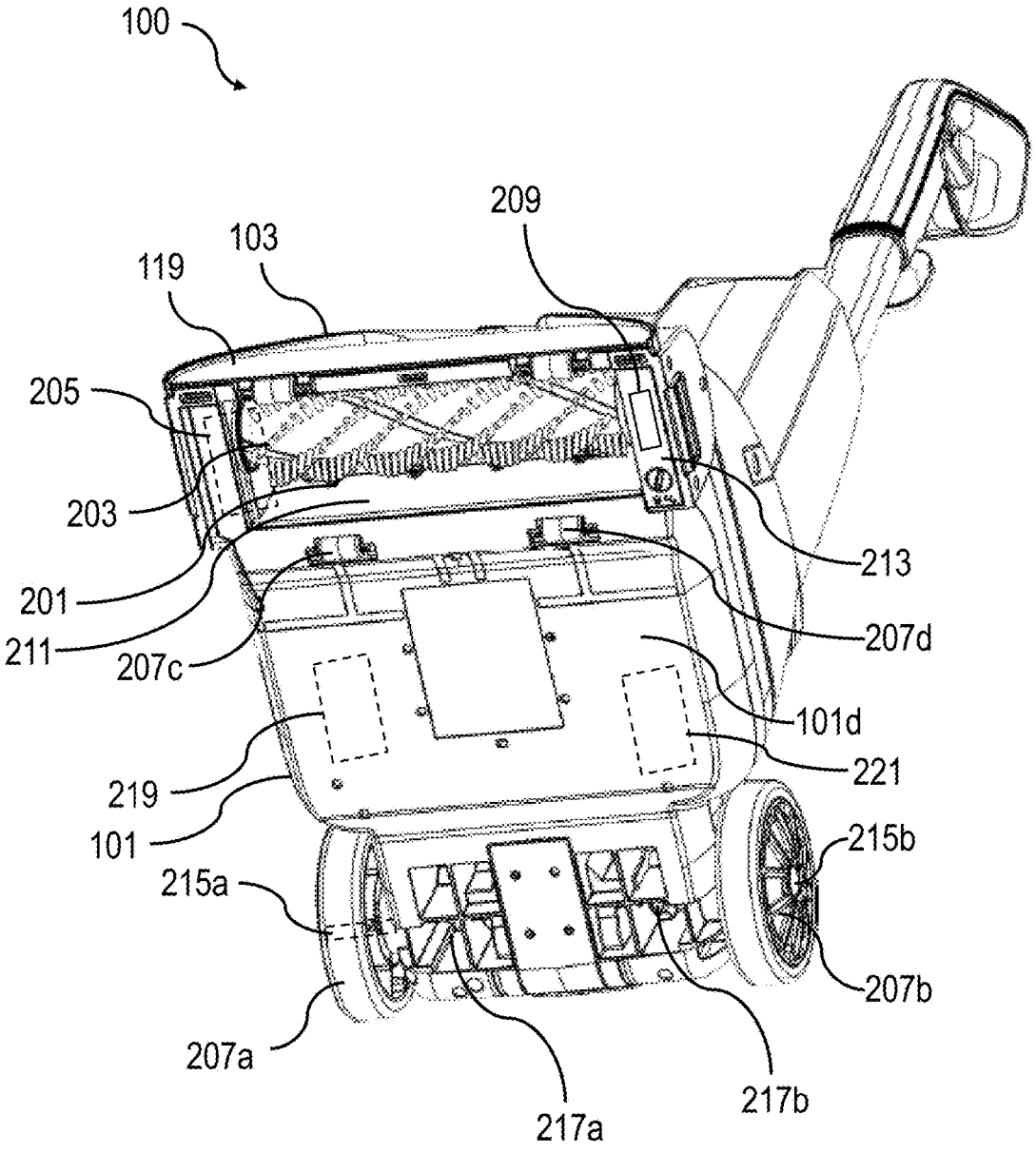

100
209
103
119
205
203
201
211
207c
213
207d
101d
221
219
101
215b
215a
207b
207a
217b
217a

FIG. 3

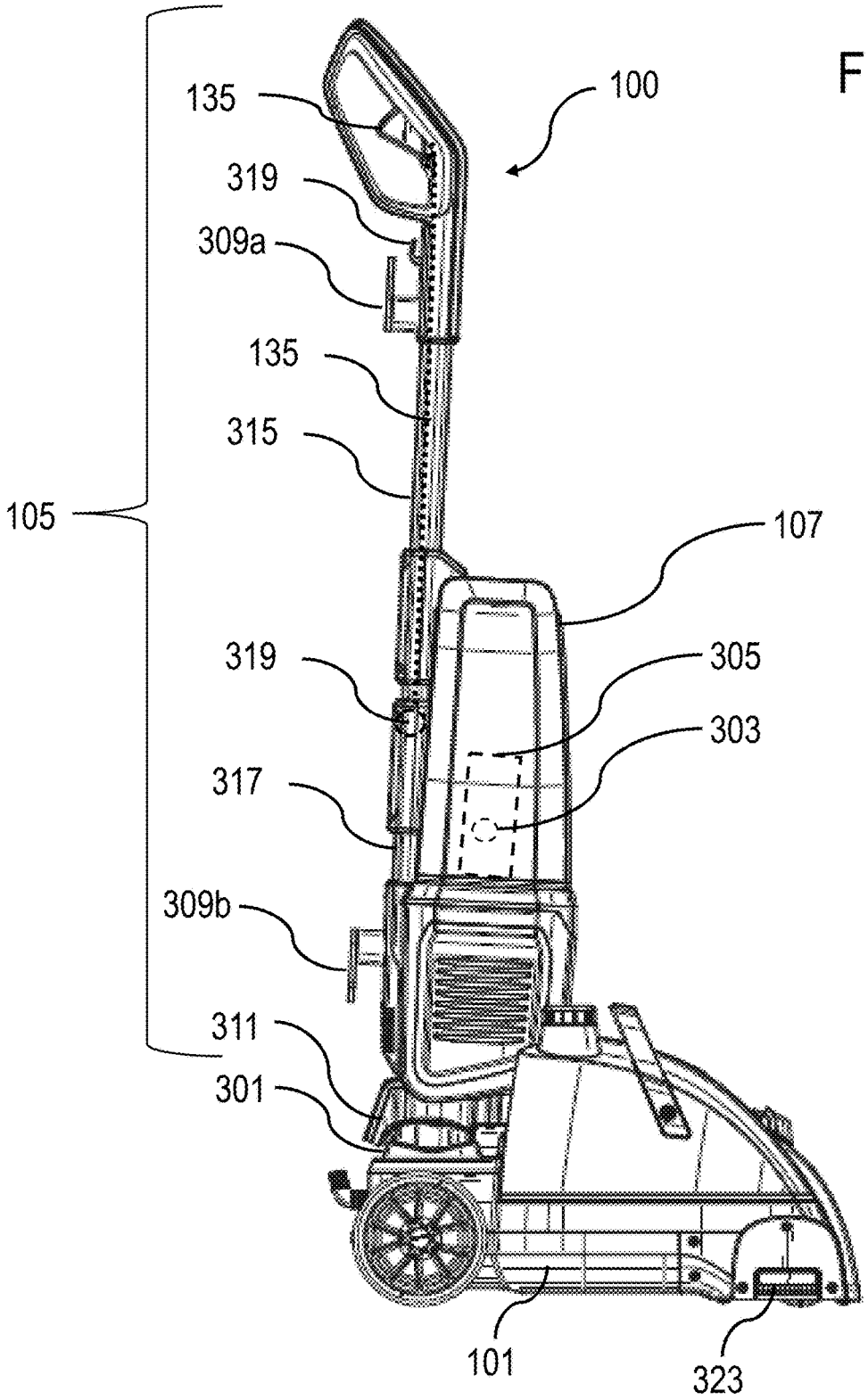

135
100
319
309a
135
315
105
107
319
305
303
317
309b
311
301
101
323

FIG. 4

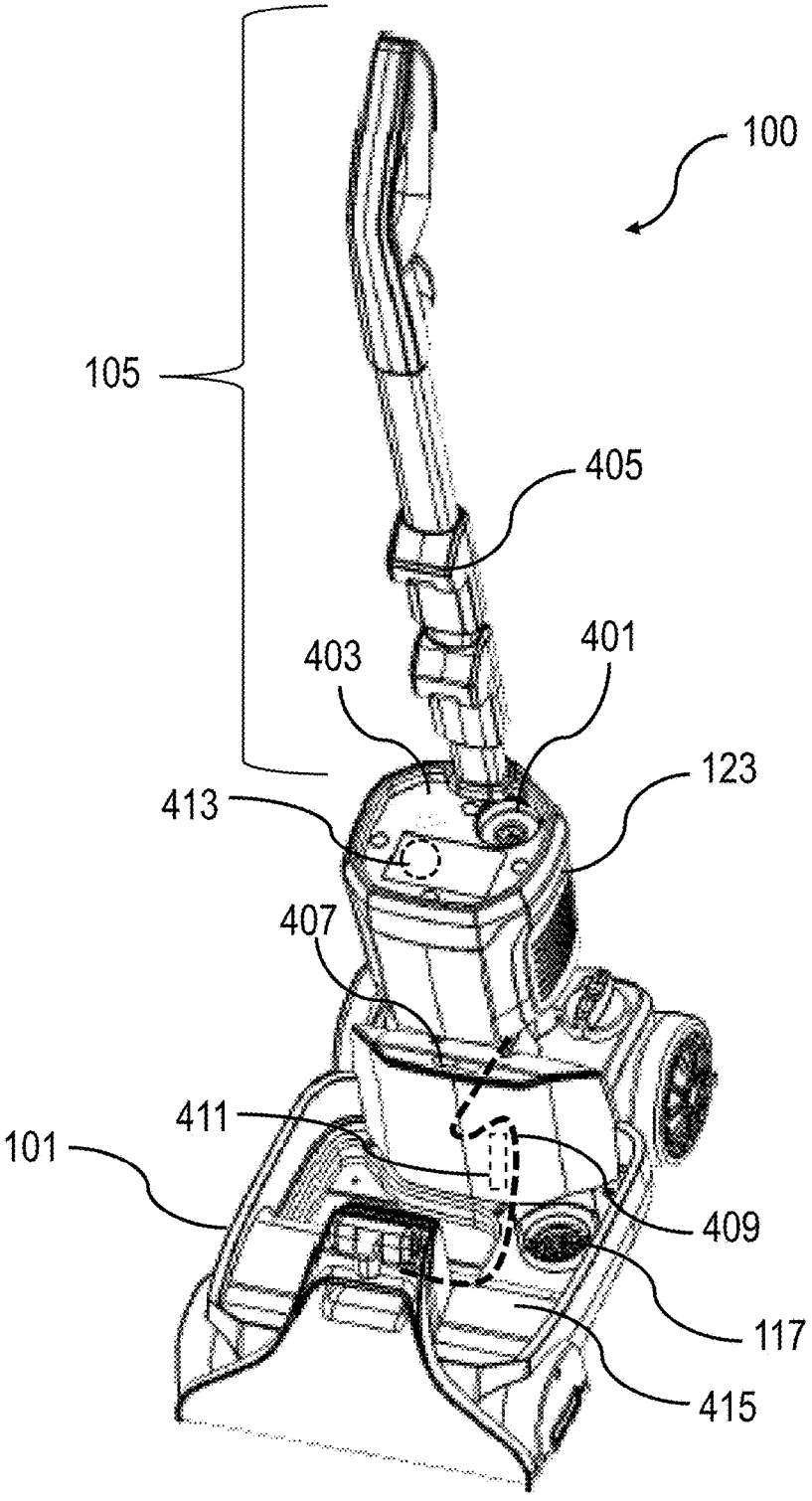


FIG. 5

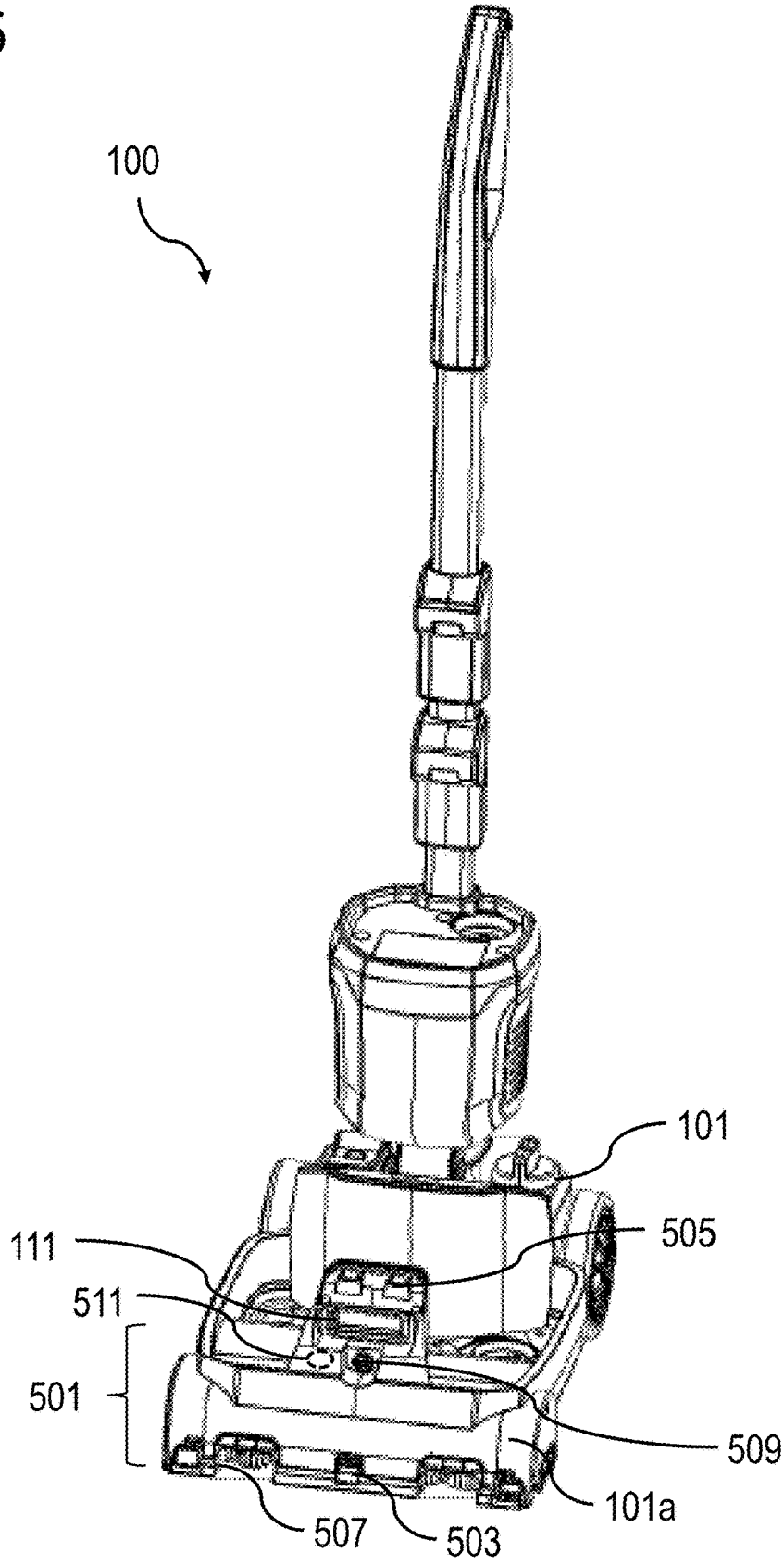


FIG. 6

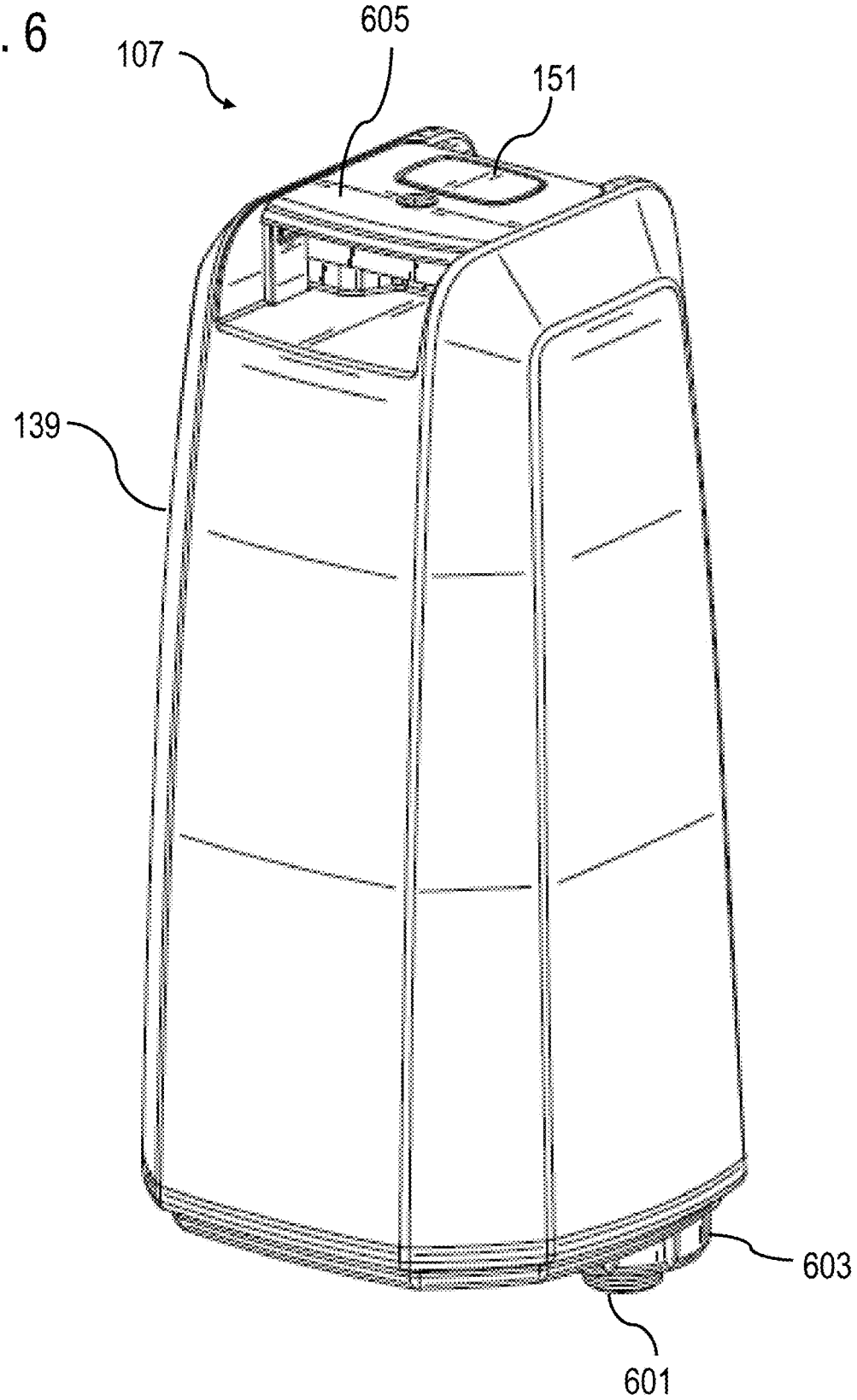


FIG. 7

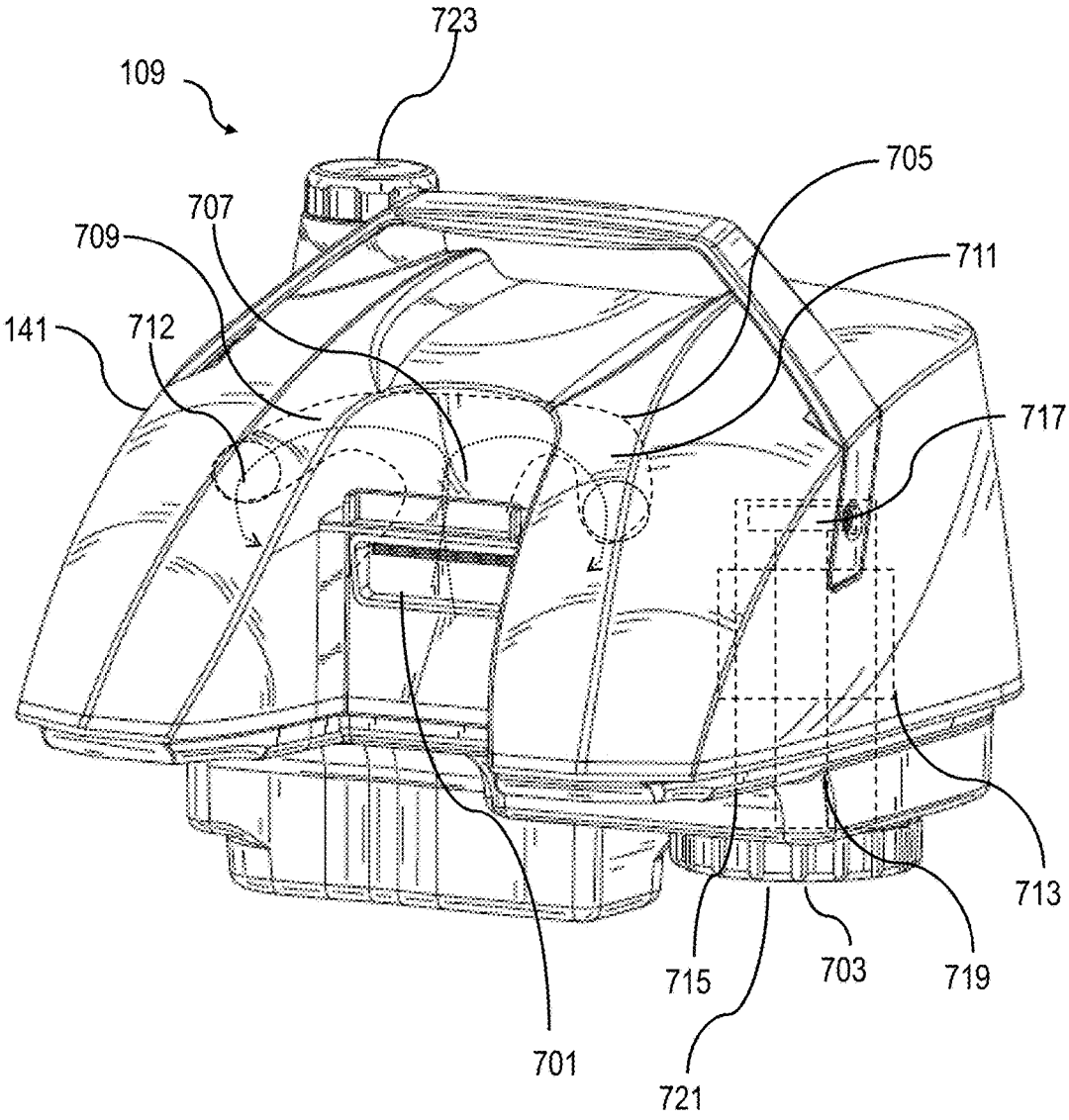


FIG. 8

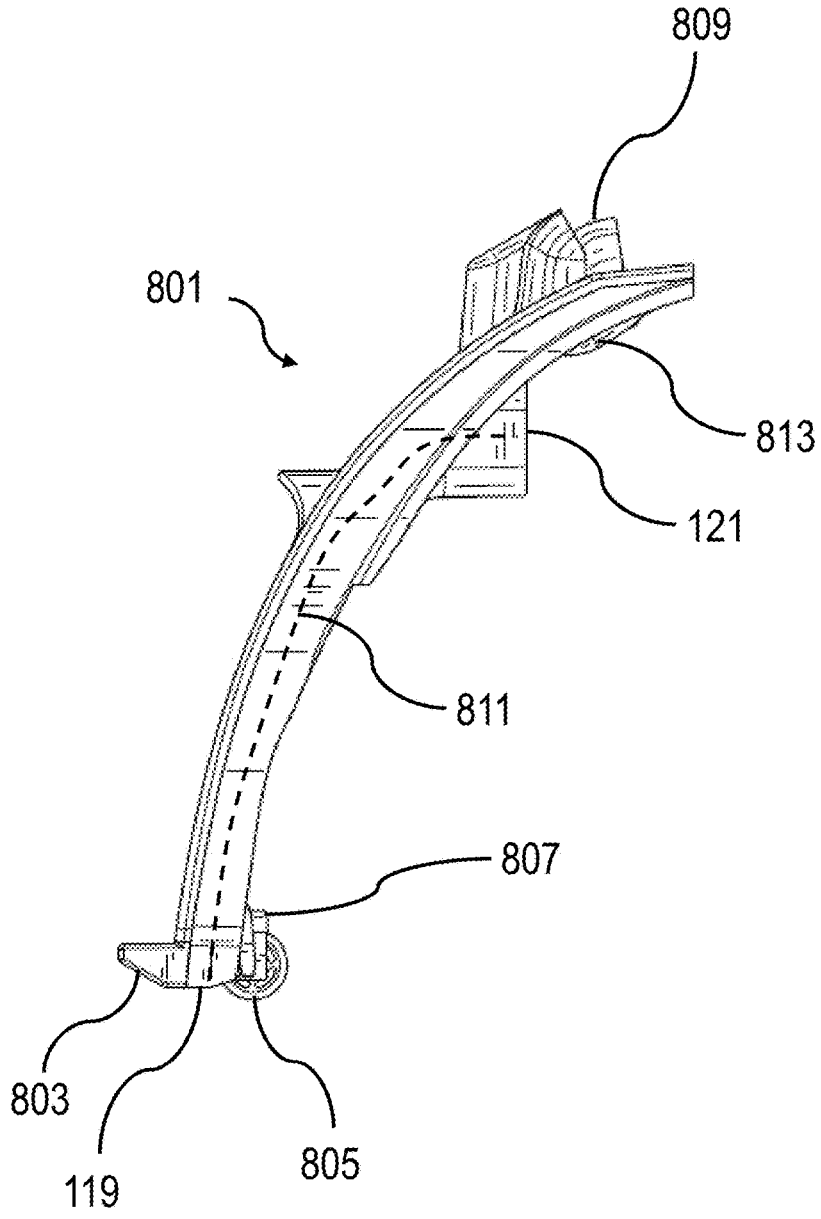


FIG. 9

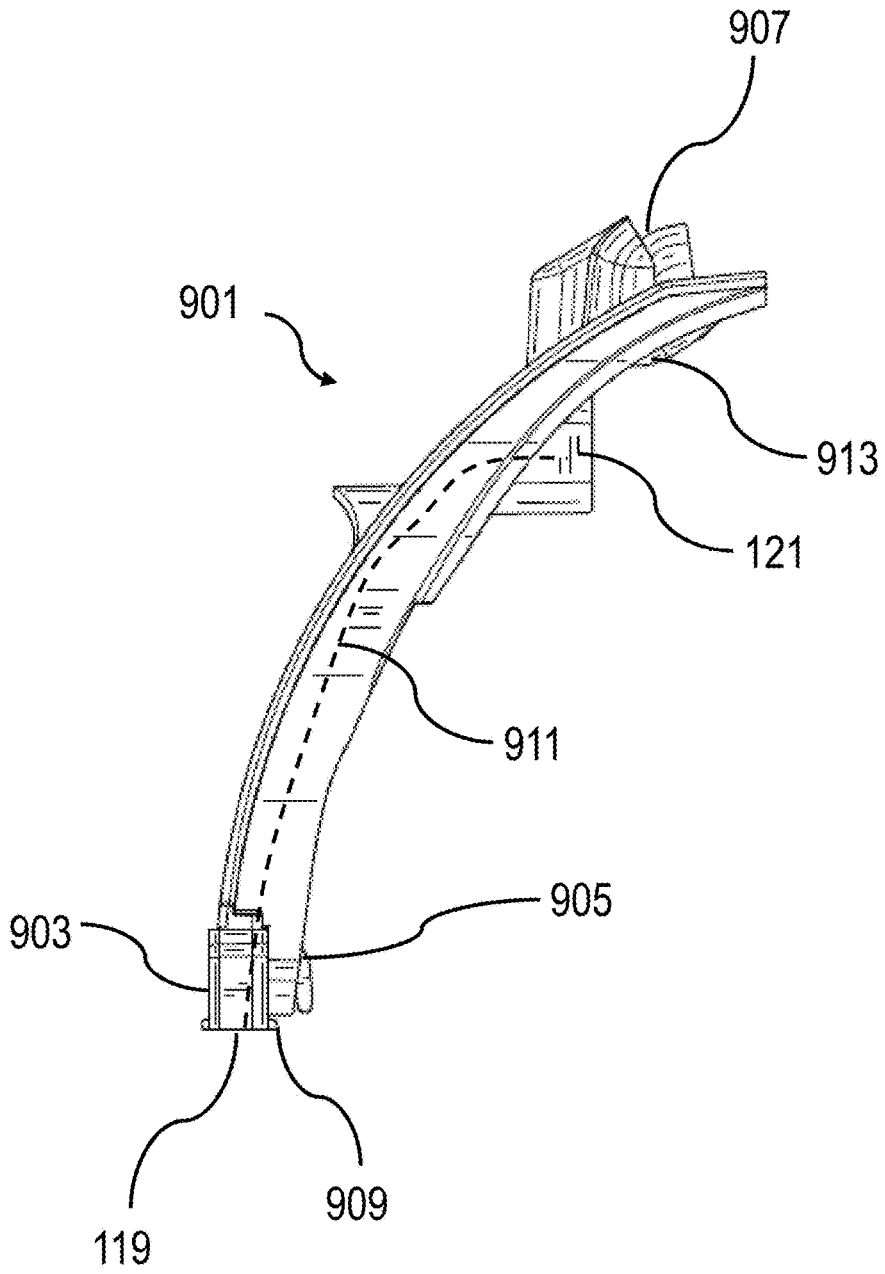


FIG. 10

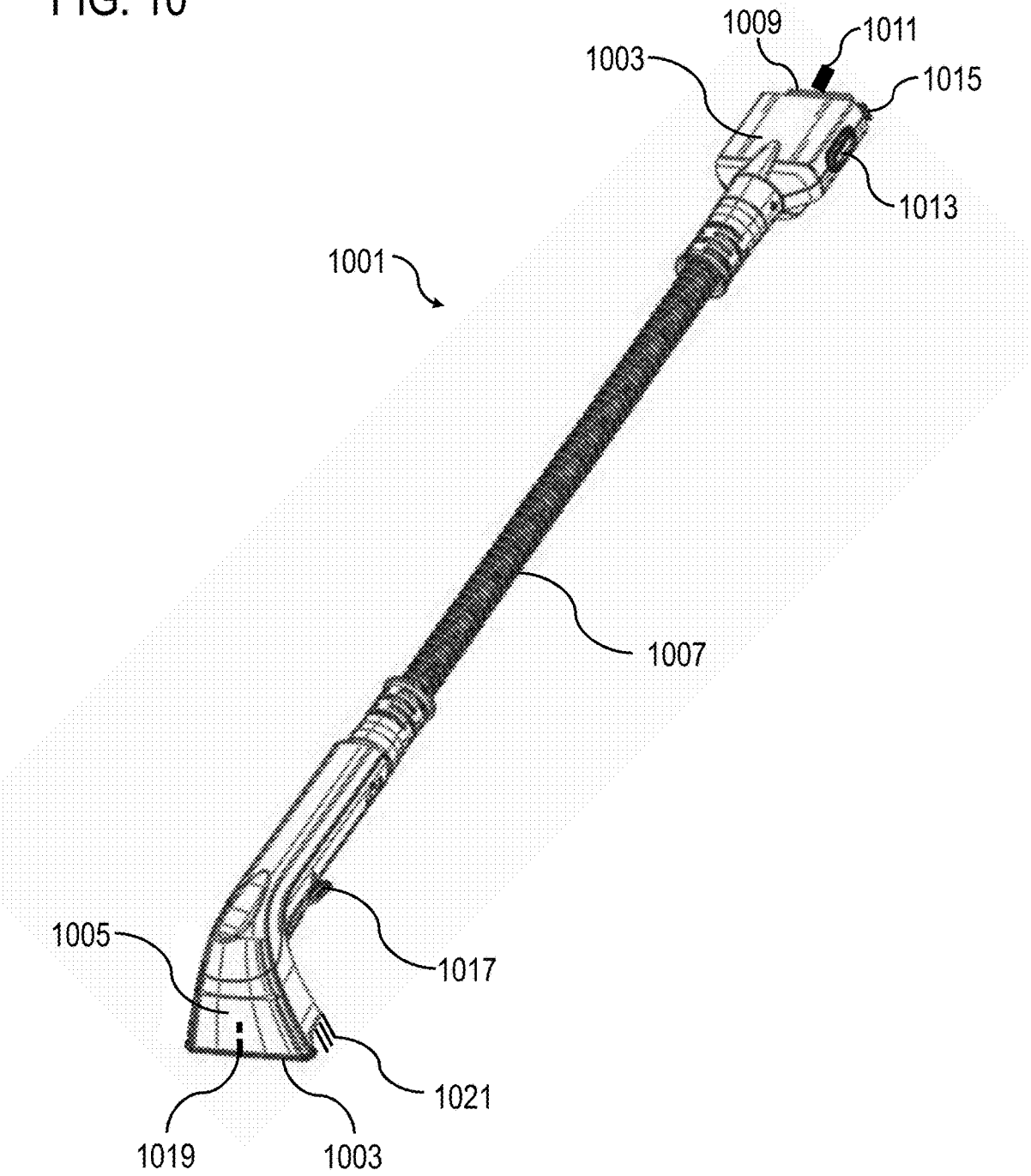


FIG. 11

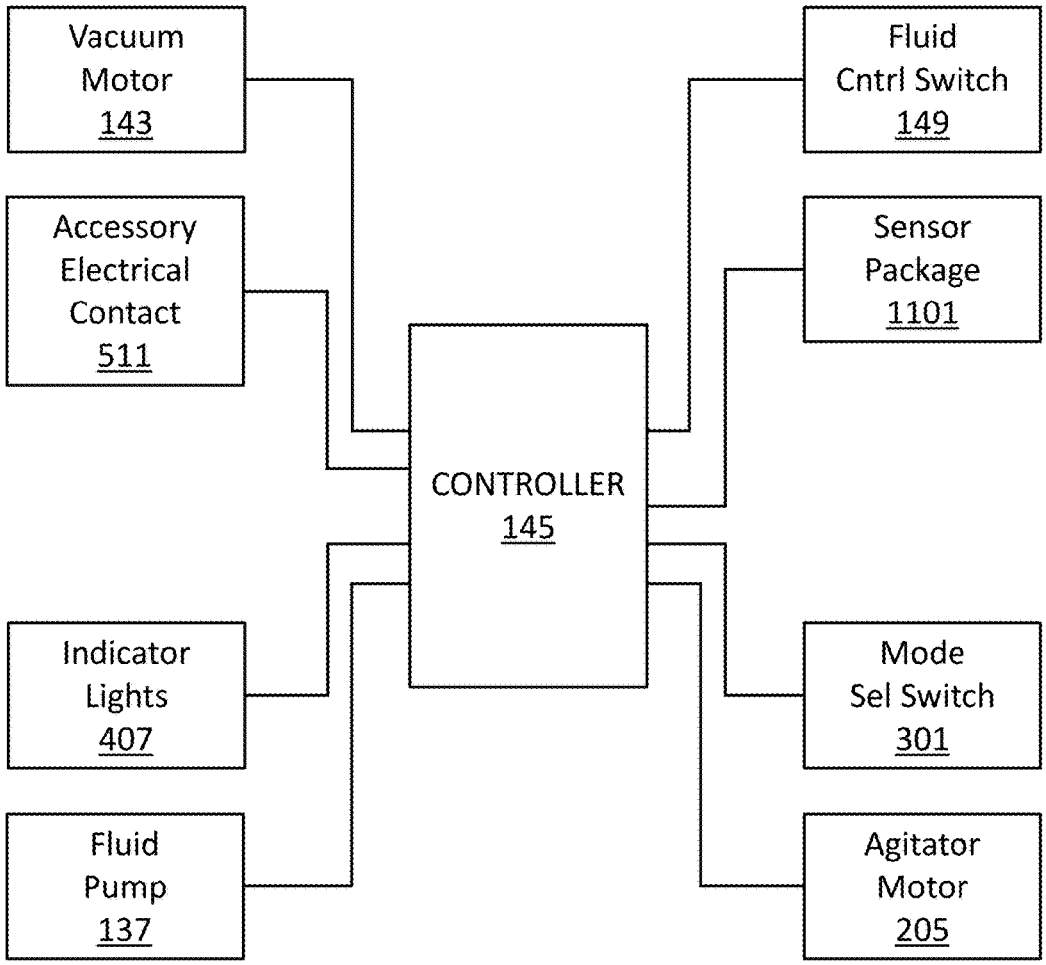

Vacuum Motor 143
Accessory Electrical Contact 511
Indicator Lights 407
Fluid Pump 137
CONTROLLER 145
Fluid Cntrl Switch 149
Sensor Package 1101
Mode Sel Switch 301
Agitator Motor 205

FIG. 12

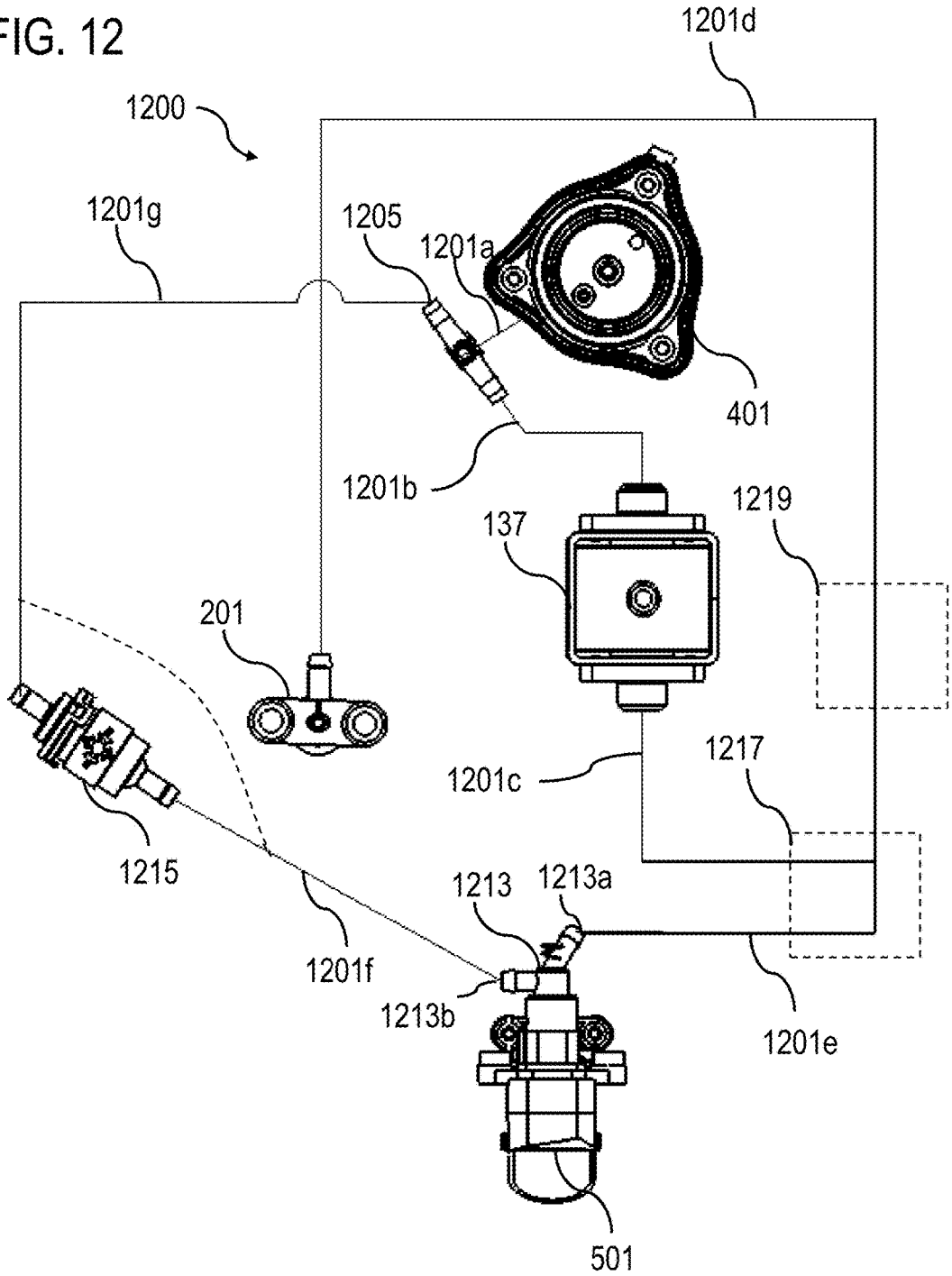

1200
1201d
1201g
1205
1201a
401
1201b
137
1219
201
1217
1201c
1215
1213
1213a
1201f
1213b
1201e
501

FIG. 13

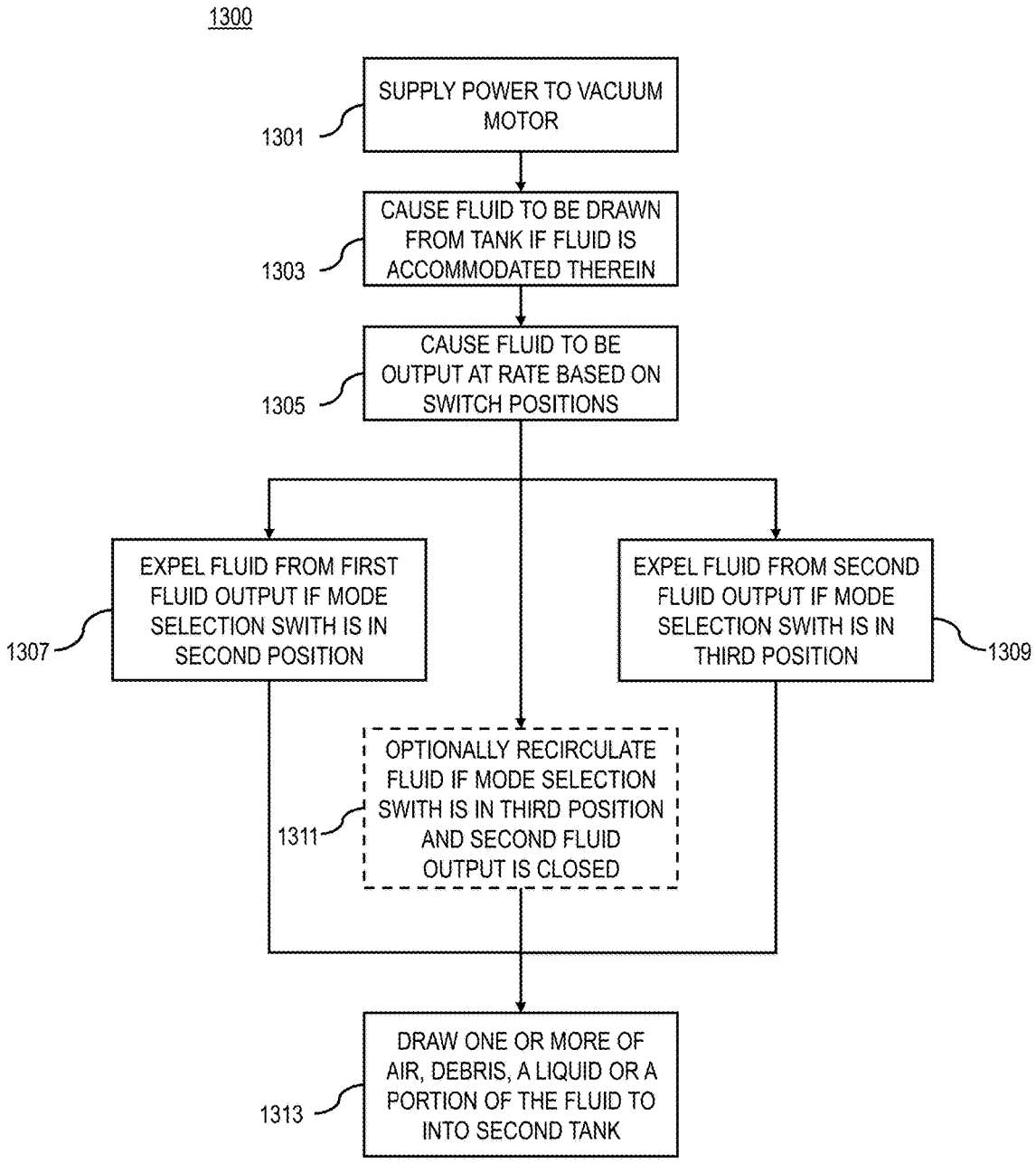
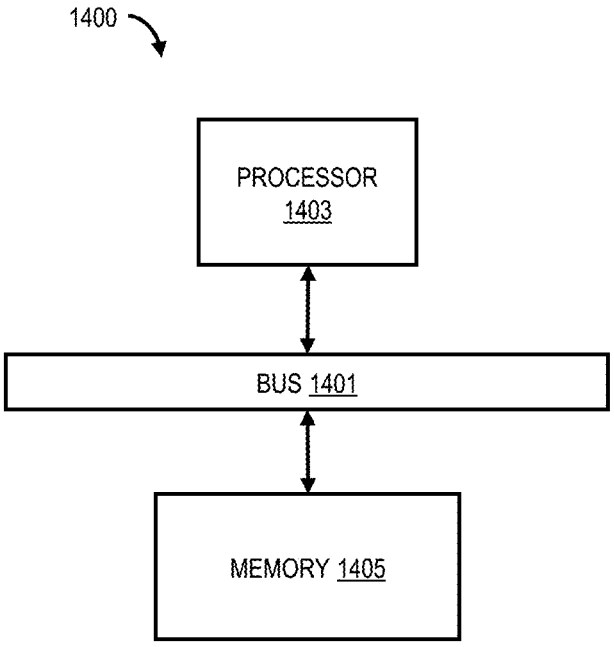

1300
SUPPLY POWER TO VACUUM MOTOR
1301
CAUSE FLUID TO BE DRAWN FROM TANK IF FLUID IS ACCOMMODATED THEREIN
1303
CAUSE FLUID TO BE OUTPUT AT RATE BASED ON SWITCH POSITIONS
1305
EXPEL FLUID FROM FIRST FLUID OUTPUT IF MODE SELECTION SWITH IS IN SECOND POSITION
1307
EXPEL FLUID FROM SECOND FLUID OUTPUT IF MODE SELECTION SWITH IS IN THIRD POSITION
1309
OPTIONALLY RECIRCULATE FLUID IF MODE SELECTION SWITH IS IN THIRD POSITION AND SECOND FLUID OUTPUT IS CLOSED
1311
DRAW ONE OR MORE OF AIR, DEBRIS, A LIQUID OR A PORTION OF THE FLUID TO INTO SECOND TANK
1313

FIG. 14



LIQUID EXTRACTION APPARATUS AND METHOD

BACKGROUND

[0001] Device manufacturers and service providers are continually challenged to develop cleaning systems capable of providing value and convenience to consumers. Conventional floor cleaning systems are often intimidating to consumers and offer limited flexibility.

BRIEF DESCRIPTION OF THE DRAWINGS

[0002] Aspects of the present disclosure are best understood from the following detailed description when read with the accompanying figures. It is noted that, in accordance with the standard practice in the industry, various features are not drawn to scale. In fact, the dimensions of the various features may be arbitrarily increased or reduced for clarity of discussion.

[0003] FIG. **1** is a perspective view of an apparatus, in accordance with some embodiments.

[0004] FIG. **2** is a bottom-side perspective view of the apparatus, in accordance with some embodiments.

[0005] FIG. **3** is a side view of the apparatus, in accordance with some embodiments.

[0006] FIG. **4** is a top-side perspective view of the apparatus with the tanks removed, in accordance with some embodiments.

[0007] FIG. **5** is a top-side perspective view of the apparatus with the tanks and the nozzle removed, in accordance with some embodiments.

[0008] FIG. **6** is a perspective view of a cleaning fluid tank, in accordance with some embodiments.

[0009] FIG. **7** is a perspective view of a recovery tank, in accordance with some embodiments.

[0010] FIG. **8** is a side view of a carpet cleaning nozzle, in accordance with some embodiments.

[0011] FIG. **9** is a side view of a hard surface nozzle, in accordance with some embodiments.

[0012] FIG. **10** is a perspective view of an accessory attachment, in accordance with some embodiments.

[0013] FIG. **11** is a schematic diagram of a control system, in accordance with some embodiments.

[0014] FIG. **12** is a diagram of a fluid flow system, in accordance with some embodiments.

[0015] FIG. **13** is a flowchart of a method, in accordance with some embodiments.

[0016] FIG. **14** is a functional block diagram of a computer or processor-based system upon which or by which an embodiment is implemented.

DETAILED DESCRIPTION

[0017] The following disclosure provides many different embodiments, or examples, for implementing different features of the provided subject matter. Specific examples of components and arrangements are described below to simplify the present disclosure. These are, of course, merely examples and are not intended to be limiting. For example, the location of a first feature over or on a second feature in the description that follows may include embodiments in which the first and second features are in direct contact, and may also include embodiments in which additional features may be between the first and second features, such that the first and second features may not be in direct contact. In addition, the present disclosure may repeat reference numerals and/or letters in the various examples. This repetition is for the purpose of simplicity and clarity and does not in itself dictate a relationship between the various embodiments and/or configurations discussed.

[0018] Further, spatially relative terms, such as "beneath," "below," "lower," "above," "upper" and the like, may be used herein for ease of description to describe one element or feature's relationship to another element(s) or feature(s) as illustrated in the figures. The spatially relative terms are intended to encompass different orientations of the device in use or operation in addition to the orientation depicted in the figures. The apparatus may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein may likewise be interpreted accordingly.

[0019] Conventional liquid extraction devices are often large, bulky, and otherwise intimidating cleaning systems that consumers usually have difficulty operating and handling. Conventional cleaning systems are often limited as to how the components of the cleaning system can be manipulated by a consumer, making transport and service difficult.

[0020] FIG. **1** is a perspective view of an apparatus **100**, in accordance with some embodiments. Apparatus **100** comprises a body **101**, a nozzle **103**, a handle **105**, a cleaning fluid tank **107**, and a recovery tank **109**. Apparatus **100** is a liquid extraction cleaning system. In some embodiments, apparatus **100** is configured to clean a surface over which apparatus **100** is positioned. Apparatus **100** is shown in an assembled state.

[0021] Body **101** comprises one or more sidewalls defining a front side **101***a*, a back side **101***b*, a top side **101***c* and a bottom side **101***d*. A first fluid output **201** (FIG. **2**) is on the bottom side **101***d* of the body **101**. Body **101** includes a first air passage **111** and a second air passage **113** communicatively coupled with the first air passage **111**. In some embodiments, first passage **111** and second air passage **113** are openings at ends of a coupler **115** having a channel connecting the first air passage **111** and the second air passage **113**. Coupler **115** is removably attached to one or more sidewalls of the body **101**. In some embodiments, coupler **115** is shaped such that the first air passage **111** is closer to the bottom side **101***d* of the body **101** than the second air passage **113**. A third air passage **117** is on the top side **101***c* of the body **101**.

[0022] Nozzle **103** is removably attached to the front side **101***a* of the body **101**. The nozzle **103** comprises a fourth air passage **119** proximate the bottom side **101***d* of the body **101** and a fifth air passage **121** proximate the top side **101***c* of the body **101**. The fifth air passage **121** is communicatively coupled with the fourth air passage **119** by a channel within nozzle **103**. The nozzle **103** is attached to the body **101** such that the first air passage **111** and the fifth air passage **121** are substantially aligned. In some embodiments, nozzle **103** is attached to the body **101** such that the first air passage **111** and the fifth air passage **121** are communicatively coupled to facilitate airflow from nozzle **103** into coupler **115**.

[0023] In some embodiments, the nozzle **103** comprises a skid portion **803** (FIG. **8**) adjacent to the fourth air passage **119** and at least one wheel **805** (FIG. **8**) on a side of the nozzle **103** opposite to the skid portion **803**, with the fourth air passage **119** being between the skid portion **803** and the at least one wheel **805**. In some embodiments, the nozzle **103** comprises a squeegee **903** (FIG. **9**) surrounding the

fourth air passage **119**, wherein the nozzle **103** has a plurality of structures **909** (FIG. **9**) extending from a base of the squeegee **903** in a direction away from the fourth air passage **119**. In some embodiments, the nozzle **103** is one of a first nozzle or a second nozzle included in a set of nozzles configured to be individually attached to the body **101**. In some embodiments, one nozzle of the set of nozzles is a carpet cleaning nozzle such as nozzle **801** (FIG. **8**) and another nozzle of the set of nozzles is a hard surface nozzle such as nozzle **901** (FIG. **9**). In some embodiments, apparatus **100** makes it possible to selectively attach a particular nozzle **103** such as nozzle **801** or nozzle **901** based on a type of surface opposite the bottom side **101***a* of body **101** to increase an ability of apparatus **100** to effectively clean the surface opposite the bottom side **101***a* of body **101**.

[0024] Handle **105** is coupled with body **101**. In some embodiments, handle **105** is rotatably coupled with body **101** such that handle **105** is capable of being in a substantially upright position with respect to body **101** or in another position between the substantially upright position with respect to body **101** and a surface over which body **101** is positioned.

[0025] Handle **105** comprises a base portion **123**, a shaft **125** and a grip portion **127**. Base portion **123** comprises a first fluid coupling **401** (FIG. **4**) communicatively coupled with the first fluid output **201** (FIG. **2**). Shaft **125** is coupled with the base portion **123**. A grip portion **127** is at an end of the shaft **125** opposite the base portion **123**.

[0026] Handle **105** is configured to rotate with respect to the body **101** about a first axis **129** and to rotate about a second axis **131** substantially perpendicular to the first axis **129**. In some embodiments, first axis **129** and second axis **131** are in different planes displaced from one another along a length of the handle **105** extending from a point at which the handle **105** is coupled with the body **101** and the grip portion **127** of handle **105**. By rotating about two distinct axes, the handle **105** makes it possible to steer the apparatus **100** while the apparatus **100** is moving by tilting the handle **105**.

[0027] In some embodiments, body **101** includes a handle locking mechanism configured to fix the handle **105** with respect to the body **101** in a storage position. In some embodiments, the storage position is substantially upright such that the handle **105** is substantially perpendicular to a surface over which the apparatus **100** is positioned. In some embodiments, the handle locking mechanism is configured to prevent the handle **105** from rotating about the first axis **129** and the second axis **131** in the storage position. In some embodiments, handle locking mechanism is configured to allow the handle **105** to rotate about the first axis **129** and the second axis **131** when the handle **105** is released from the storage position.

[0028] In some embodiments, grip portion **127** includes a trigger **133**. Shaft **125** has a mechanical linkage **135** extending from the trigger **133** to the base portion **123** of the handle **105**. A fluid pump **137** is communicatively coupled with the first fluid coupling **401**, the first fluid output **201**, and an actuator within handle **105**. In some embodiments, fluid pump **137** is housed within base portion **123** of handle **105**. In some embodiments, fluid pump **137** is housed within body **101**. Mechanical linkage **135** is configured to contact the actuator based on an actuation of the trigger **133**. The fluid pump **137** is configured to cause fluid to be supplied to the first fluid output **201** based on the actuation of the trigger **133** and the contact between the mechanical linkage **135** and the actuator. In some embodiments, mechanical linkage **135** comprises a shaft capable of moving internally along a linear length of shaft **125** such that actuation of trigger **133** causes the mechanical linkage **135** to move along the linear length of shaft **125** to contact the actuator. In some embodiments, trigger **133** is communicatively coupled with the actuator or with fluid pump **137** by way of an electrical connection to cause the fluid pump **137** to supply fluid to the first fluid output **201** based on the actuation of trigger **133**.

[0029] Each of the cleaning fluid tank **107** and the recovery tank **109** is communicatively coupled with a corresponding portion of body **101**. The cleaning fluid tank **107** is over the base portion **123**. Cleaning fluid tank **107** comprises a cleaning fluid tank vessel **139** configured to accommodate a fluid and a second fluid coupling **601** (FIG. **6**) configured to be communicatively coupled with the first fluid coupling **401**.

[0030] The recovery tank **109** is over the body **101**. Recovery tank **109** comprises a recovery tank vessel **141** separated from the cleaning fluid tank vessel **139**. Recovery tank **109** also includes a sixth air passage **701** (FIG. **7**) configured to be communicatively coupled with the second air passage **113** and a seventh air passage **703** (FIG. **7**) configured to be communicatively coupled with the third air passage **117**.

[0031] A vacuum motor **143** is in the base portion **123** of the handle **105**. The vacuum motor **143** has an inlet communicatively coupled with the third air passage **117** and an outlet that vents to one or more of a side of the base portion **123** or a vent in body **101**. In some embodiments, the inlet of the vacuum motor **143** is communicatively coupled with the third air passage **117** by way of a hose extending from base portion **123** to body **101**, and the first fluid coupling **401** is communicatively coupled with the first fluid output **201** by way of a tube inside the hose. In some embodiments, the first fluid coupling **401** is communicatively coupled with the first fluid output **201** by way of a tube outside the hose coupling vacuum motor **143** and third air passage **117**. In some embodiments, the the hose coupling vacuum motor **143** and third air passage **117** is substantially internal to handle **105** and body **101** such that the hose coupling vacuum motor **143** and third air passage **117** is limited from exposure and protected from external elements that could damage the hose coupling vacuum motor **143** and third air passage **117**.

[0032] A controller **145** is included in the body **101**. Controller **145** is communicatively coupled with the vacuum motor **143** and the fluid pump **137**. The controller **145** is configured to activate the fluid pump **137** to cause fluid contained in the cleaning fluid tank **107** to be supplied to the first fluid output **201**, and to activate the vacuum motor **143** to draw one or more of air, debris, a liquid or a portion of the fluid into the recovery tank **109** by way of the first air passage **111**. In some embodiments, controller **145** is housed inside the body **101**. In some embodiments, the controller **145** is outside the body **101**. In some embodiments, the controller **145** is housed within base portion **123**.

[0033] Controller **145** comprises a chipset having a processor and a memory (e.g., chipset **1400**, FIG. **14**). Controller **145** is communicatively coupled with one or more of the fluid pump **137** or the vacuum motor **143**. In some embodiments, the memory included in the controller **145** has computer executable instructions stored thereon that, when

executed by the processor of controller **145**, cause the fluid pump **137** and/or the vacuum motor **143** to turn on or off. In a default operative state, the vacuum motor **143** is configured to draw air into the inlet of the vacuum motor **143** and exhaust air from the outlet of the vacuum motor **143**. In some embodiments, the controller **145** is configured to cause the vacuum motor **143** to run in reverse such that the vacuum motor **143** draws air into the outlet of the vacuum motor **143** and exhausts air from the inlet of the vacuum motor **143**.

[0034] Body **101** optionally comprises a headlight **147** communicatively coupled with the controller **145**. If body **101** includes headlight **147**, controller **145** is configured to cause the headlight **147** to be on or off based on an actuation of a system power switch, a light control switch, a fluid release or agitator control switch, or other suitable switch, or one or more of the controller **145**, vacuum motor **143** or other suitable component of apparatus **100** being turned on.

[0035] Apparatus **100** includes a fluid control switch **149** that is configured to be in one of a plurality of selectable positions. The controller **145** is configured to cause fluid contained in the cleaning fluid tank **107** to be supplied to the first fluid output **201** at a rate based on the position of the fluid control switch **149**. For example, if the fluid control switch is in a first position, controller **145** causes fluid pump **137** to supply cleaning fluid at a first flow rate measured in gallons per minute (GPM) or some other suitable unit. If the fluid control switch is in a second position, controller **145** causes fluid pump **137** to supply cleaning fluid at a second flow rate measured in gallons per minute (GPM) or some other suitable unit greater than the first flow rate. If the fluid control switch is in a third position, controller **145** causes fluid pump **137** to supply cleaning fluid at a third flow rate measured in gallons per minute (GPM) or some other suitable unit greater than the first flow rate and greater than the second flow rate. In some embodiments, the selected flow rate corresponds to an operation mode of apparatus **100**. In some embodiments, the first flow rate is associated with a hard surface mode, the second flow rate is associated with a quick drying carpet cleaning mode, and the third flow rate is associated with a deep clean carpet cleaning mode. In some embodiments, a lower flow rate results in a lesser amount of fluid which is expelled from first fluid output **201** onto a surface opposite the bottom side **101***d* of body **101**. The amount of fluid expelled has an effect on the dry time or the amount that the surface opposite the bottom side **101***d* of body **101** is soaked by cleaning fluid expelled from first fluid output **201**.

[0036] In some embodiments, the fluid control switch **149** is on the top side **101***c* of body **101**. In some embodiments, the fluid control switch **149** in on base portion **123** or grip portion **127** of handle **105**.

[0037] In some embodiments, body **101** has a second fluid output **509** (FIG. **5**) communicatively coupled with the first fluid coupling **401**. In some embodiments, the second fluid output **509** is on the front side **101***a* of body **101** in a position that is covered by nozzle **103** if nozzle **103** is attached to body **101**. Second fluid output **509** is exposed if the nozzle **103** is detached from the body **101**. The first air passage **111** and the second fluid output **509** are configured to mate with an accessory connector **1001** (FIG. **10**) comprising an accessory fluid coupling and an accessory connector air passage.

[0038] Cleaning fluid tank **107** has a cleaning fluid tank locking mechanism **151** on a top portion of the cleaning fluid tank vessel **139**. In some embodiments, the cleaning fluid tank locking mechanism **151** comprises a latch, hook, or other suitable fastener configured to removably secure the cleaning fluid tank **107** to base portion **123** and shaft **125**. Shaft **125** has a lock hook **153** configured to mate with a portion of cleaning fluid tank locking mechanism **151**. Cleaning fluid tank locking mechanism **151** includes a button, switch or other suitable structure configured to release cleaning fluid tank locking mechanism **151** to allow removal of the cleaning fluid tank **107** from a secured position between base portion **123** and shaft **125**.

[0039] In some embodiments, a height of a portion of body **101** over which the recovery tank **109** is positioned is minimized to reduce an overall height of body **101** and recovery tank **109**. The reduced height improves a user's ability to maneuver the apparatus **100** around and under objects such as furniture. In some embodiments, one or more of the fluid pump **137**, the vacuum motor **143**, the controller **145**, or some other suitable component of apparatus **100** is housed in base portion **123** of handle **105** to minimize the overall height of body **101** and recovery tank **109**. In some embodiments, one or more of the fluid pump **137**, the vacuum motor **143**, the controller **145**, or some other suitable component of apparatus **100** is positioned in body **101** as close to the back side **101***b* as possible to minimize the height of the portion of body **101** over which the recovery tank **109** is positioned.

[0040] In use, one or more components of body **101** are configured to cause cleaning fluid accommodated within cleaning fluid tank **107** to be expelled onto a surface over which the body **101** is positioned, and to cause one or more of air, debris, a liquid or a portion of the fluid to be drawn from the surface over which the body **101** is positioned into the recovery tank **109**.

[0041] The various embodiments discussed herein improve user confidence in the ability to one or more of operate, transport or operate a liquid extraction apparatus such as apparatus **100**. In some embodiments, the apparatus **100** additional provides a user with flexibility to use the apparatus **100** to clean different types of surfaces by easily reconfiguring the apparatus **100** to a combination of nozzle **103**, operating mode, accessory attachment and/or fluid flow rate that corresponds to the user's desired cleaning depth and drying time, as well as the type of surface that is to be cleaned using apparatus **100**.

[0042] FIG. **2** is a bottom-side perspective view of apparatus **100**, in accordance with some embodiments. One or more first fluid output **201** are on the bottom side **101***d* of body **101**. The one or more first fluid outputs **201** comprise a jet, a spray nozzle, or some other suitable structure through which a fluid is capable of being expelled. The first fluid output **201** is communicatively coupled with the first fluid coupling **401** (FIG. **4**) by way of a fluid flow path extending from the first fluid coupling **401** to the first fluid output **201**. The first fluid output **201** is configured to output cleaning fluid received from cleaning fluid tank **107** to facilitate distribution of a cleaning fluid stored in cleaning fluid tank **107** onto a surface external to the body **101**.

[0043] An agitator **203** is on the bottom side **101***d* of body **101**. An agitator motor **205** is communicatively coupled with the controller **145** (FIG. **1**) and configured to cause the agitator **203** to move based on an instruction received from the controller **145**.

[0044] At least two wheels **207***a*-**207***d* (collectively referred to as "wheel(s) **207**") are rotatably coupled with the

body **101**. Wheels **207** are configured to support at least a portion of the bottom side **101***d* of body **101** above a surface in contact with at least one of the at least two wheels **207**.

[0045] Agitator **203** is communicatively coupled with the agitator motor **205**. Agitator **203** is a rotary brush. In some embodiments, agitator **203** is a spin-brush, other suitable type brush, or some other suitable structure capable of disturbing, sweeping or agitating a surface beneath the bottom side **101***d* of body **101** in contact with agitator **203**. In some embodiments, agitator **203** comprises a plurality of bristles, a squeegee, one or more blades, or other suitable topography or material. Agitator motor **205** is configured to cause the agitator **203** to rotate or move, based on one or more of a type of agitator **203**, power caused to be supplied to the agitator motor **205** or an instruction output by the controller **145**. In some embodiment agitator motor **205** is configured to cause agitator **203** to rotate in a direction toward the fourth air passage **119**. In some embodiments, agitator motor **205** is configured to cause agitator **203** to rotate in a direction opposite to a direction of movement of body **101**.

[0046] In some embodiments, the apparatus **100** is configured to improve user operability by facilitating forward and backward cleaning of a surface beneath the apparatus **100**. In some embodiments, one or more of controller **145** or agitator motor **205** is configured to cause the agitator **203** to move in a first direction based on a determination that cleaning fluid is not being expelled from first fluid output **201** and in a second direction different from the first direction based on a determination that cleaning fluid is being expelled from first fluid output **201**, increasing the operability and cleaning performance capabilities of the apparatus **100**.

[0047] In some embodiments wheels **207***c* and **207***d* are configured to maximize an amount that agitator **203** is in contact with a surface beneath the body **101**. In some embodiments, the controller **145** is configured to cause the height of the wheels **207***c* and **207***d* to be adjusted based on the type of surface beneath the body **101**. In some embodiments, the controller **145** is configured to determine whether the agitator **203** should penetrate deeply into the surface beneath the body **101**, lightly contact the surface beneath the body **101**, or be free from contacting the surface beneath the body **101**, based on the detected type of surface beneath the body **101**.

[0048] In some embodiments, the agitator motor **205** is configured to adjust the height of the agitator **203** with respect to the bottom side **101***d* of body **101**. In some embodiments, the controller **145** is configured to one or more of cause the agitator motor **205** to adjust the height of the agitator **203** with respect to the bottom side **101***d* of body **101** or cause the agitator motor **205** to not cause the agitator **203** to rotate based on a detected type of surface beneath the body **101**. In some embodiments, the height of agitator **203** with respect to the bottom side **101***d* of body **101** is configured to be manually adjusted. In some embodiment, the height of one or more of agitator **203** or wheels **207***c* and **207***d* with respect to the bottom side **101***d* of body **101** is fixed.

[0049] In some embodiments, a movement sensor **209** is communicatively coupled with controller **145**. The movement sensor **209** is configured to detect a direction the body **101** moves. In some embodiments, movement sensor **209** comprises one or more of a rotation sensor configured to detect a rotation direction of at least one of wheels **207**, a gps unit, a gyroscope, or other suitable sensor configured to collect data upon which the controller **145** is capable of determining the direction of movement of body **101** based on data received from the movement sensor **209**. In some embodiments, controller **145** is configured to cause the agitator motor **205** to cause the agitator **203** to rotate in a direction opposite to the direction of movement of the body **101**. In some embodiments, controller **145** is configured to cause the agitator motor **205** to cause the agitator **203** to rotate in a direction opposite to a rotation direction of wheels **207**. In some embodiments, controller **145** is configured to cause the agitator motor **205** to cause the agitator **203** to rotate in a direction toward the front side **101***a* of body **101** if the body **101** is moving in a forward direction and in a direction toward the rear side **101***b* of body **101** if the body **101** is moving in a backward direction, based on the detected direction of movement of body **101**.

[0050] The bottom side **101***d* of body **101** has an agitator cavity **211** defined by one or more sidewalls of body **101**. The agitator cavity **211** is configured to accommodate the agitator **203** such that a first portion of the agitator **203** is within the agitator cavity **211** and a second portion of the agitator **203** is exposed in a direction away from the body **101**. In some embodiments, the first fluid output **201** is inside the agitator cavity **211**. In some embodiments first fluid output **201** is positioned inside the agitator cavity **211** such that the agitator **203** is between the first fluid output **201** and a surface beneath the body **101**. In some embodiments, first fluid output **201** is positioned inside the agitator cavity **211** to wet the agitator **203** with cleaning fluid expelled from the first fluid output **201**. In some embodiments, first fluid output **201** is positioned inside the agitator cavity **211** in a location to facilitate direct application of the cleaning fluid expelled from first fluid output **201** onto a surface beneath the body **101**. In some embodiments, the first fluid output **201** is positioned outside the agitator cavity **211** in a location to facilitate direct application of the cleaning fluid expelled from first fluid output **201** onto a surface beneath the body **101**. In some embodiments, body **101** has more than one first fluid output **201** positioned in one or more locations on body **101**.

[0051] The agitator cavity **211** is free from including the fourth air passage **119** or an air passage through a sidewall of body **101** defining the agitator cavity **211** in communication with first air passage **119** or a nozzle flow path within nozzle **103**.

[0052] In some embodiments, if agitator **203** is a rotary brush, agitator **203** is configured to be mounted in agitator cavity **211** by way of at least one brush roll cover **213**. Brush roll cover **213** is configured to be removably attached to body **101**. Brush roll cover **213** is configured to support the agitator **203** in a manner that allows the agitator **203** to rotate within the agitator cavity **211**. In some embodiments, brush roll cover **213** is configured to support the agitator **203** in a manner that allows the agitator **203** to rotate within the agitator cavity **211** such that the agitator **203** is free from having an axle passing through the agitator **203** or around which the agitator **203** is configured to rotate.

[0053] Each of the wheels **207***a*-**207***d* is independently coupled with body **101** so that each wheel **207** is free to rotate about a corresponding axis of rotation. In some embodiments, at least wheels **207***a* and **207***b* are independently coupled with body **101** by a corresponding axle **215***a*,

215*b* and pin fastener **217***a*, **217***b*. In some embodiments, wheels **207***a* and **207***b* are each attached to a single axle that extends from wheel **207***a* to wheel **207***b*. In some embodiments, if attached to a single axle, each of wheels **207***a* and **207***b* is configured to rotate independently around the single axle. In some embodiments, at least wheels **207***c* and **207***d* are each attached to a single corresponding axle that extends from wheel **207***c* to wheel **207***d*. In some embodiments, if attached to a single axle, each of wheels **207***c* and **207***d* is configured to rotate independently around the single axle.

[0054] Wheels **207***a* and **207***b* are larger in diameter than wheels **207***c* and **207***d*. Wheels **207***a* and **207***b* are configured to separate the bottom side **101***d* of body **101** away from a surface beneath the body **101** that is in contact with at least one of wheels **207***a* or **207***b* to promote movement of the body **101** over the surface and contact between agitator **203** and the surface beneath body **101**. In some embodiments, wheels **207***c* and **207***d* have a diameter configured to facilitate contact between a portion of nozzle **103** surrounding fourth air passage **119** and a surface beneath the body **101**. In some embodiments, the one or more axles around which wheels **207***c* and **207***d* are each configured to rotate is coupled with at least one height adjuster **219**. Height adjuster **219** is configured to raise or lower wheels **207***c* and **207***d* with respect to the bottom side **101***d* of body **101**. In some embodiments, the at least one height adjuster **219** is a manual adjustment member configured to be manipulated to move and lock the wheels **207***c* and **207***d* into one of at least two predetermined positions. In some embodiments, the at least one height adjuster **219** is a motor communicatively coupled with controller **145**. In some embodiments, controller **145** is configured to cause the at least one height adjuster **219** to move the wheels **207***c* and **207***d* based on a selected one of at least two preset positions with respect to the bottom side **101***d* of body **101**.

[0055] In some embodiments, a surface detection sensor **221** is on the bottom side **101***d* of body **101** communicatively coupled with controller **145**. The surface detection sensor **221** comprises one or more of a distance sensor configured to detect a distance between the bottom side **101***d* of body **101** and a surface beneath the body **101**. In some embodiments, the surface detection sensor **221** is a location sensor configured to detect a geographic position of the body **101**, and the controller **145** is configured to determine a type of surface beneath the body **101** based on the detected location of the body **101**. In some embodiments, the surface detection sensor **221** is a photo-eye; a light sensor; a floor-type detector configured to identify if the surface beneath the body **101** is a hard surface or a carpet, and one or more of a type of hard surface (e.g., hardwood, ceramic, linoleum, laminate flooring, or other suitable material), or a pile height of a carpet, or a weave-type of a carpet; or some other suitable type of sensor capable of collecting data based upon which a type of surface beneath the body **101** is capable of being identified. In such an embodiment, the controller **145** is configured to one or more of cause the height adjuster **219** to change the position of wheels **207***c* and **207***d* based on the type of surface determined based on data collected from the surface detection sensor **221**, cause an alert to be output indicating the type of surface beneath the body **101**, cause a status of the height of the wheels **207***c* and **207***d* to be output indicating that the height of wheels **207***c* and **207***d* is acceptable for the detected type of surface beneath body **101** or that the height of wheels **207***c* and **207***d* should be adjusted based on the detected type of surface beneath the body **101**, or cause a status of the type of nozzle **103** attached to body **101** be output indicating that the type of nozzle **103** is acceptable for the detected type of surface beneath body **101** or that the type of nozzle **103** should be changed based on the detected type of surface beneath the body **101**.

[0056] In some embodiments, one or more sides of the body **101** comprise one or more quick-release panels to facilitate easy access for a user to service the apparatus **100**. In some embodiments, at least one of the one or more quick-release panels is coupled with another portion of body **101** by one or more fasteners. In some embodiments, the one or more fasteners are capable of being tightened and loosened using a conventional screwdriver, a flathead screwdriver, a Philips head screwdriver, a hex-head screw driver, a torx-head screw driver, or other suitable type of screwdriver head. In some embodiments, all of the quick-release panels that are coupled with the body **101** by a fastener are coupled by a same type of fastener to facilitate ease of access to the body **101** and the components housed therein.

[0057] FIG. **3** is a side view of apparatus **100**, in accordance with some embodiments. A mode selection switch **301** is communicatively coupled with the controller **145** (FIG. **1**). If the mode selection switch **301** is in a first position, and power is supplied to the controller **145**, the controller **145** is configured to cause the agitator **203** to move and to cause cleaning fluid to be supplied to the first fluid output **201** (FIG. **2**) at a flow rate based on the position of the fluid control switch **149** (FIG. **1**). If the mode selection switch **301** is in a second position, and power is supplied to the controller **145**, the controller **145** is configured to cause the agitator **203** to be stationary and cleaning fluid to be supplied to the second fluid output **501** (FIG. **5**) at a predetermined flow rate independent of the position of the fluid control switch **301**. In some embodiments, the mode selection switch **301** is movable to one of three selectable positions. If the mode selection switch **301** is moved to any of the first position, the second position, or a third position other than the first position or the second position, the controller **145** is configured to delay the activation of fluid pump **137** (FIG. **1**) by a predetermined quantity of time. For example, in some embodiments, the controller **145** is configured to delay the activation of fluid pump **137** by a period in a range of one second to ten seconds, or some other suitable delay, to prevent cleaning fluid from being drawn from cleaning fluid tank **107** if a user inadvertently moved the mode selection switch **301** to the first position or the second position.

[0058] In some embodiments, a magnet **303** is inside the cleaning fluid tank **107**. The magnet **303** is configured to float based on a quantity of fluid accommodated within the cleaning fluid tank **107**. In some embodiments, the magnet **303** is inside a float cage **305**. In some embodiments, magnet **303** has complete freedom of movement within the cleaning fluid tank **107**. Base portion **123** includes a sensor **413** (FIG. **4**) configured to detect a distance between the magnet **303** and the sensor **413** based on a magnetic field associated with the magnet **303**. The controller **145** is configured to determine a quantity of cleaning fluid accommodated within cleaning fluid tank **107** based on the distance between the magnet **303** and sensor **413**. In some embodiments, the controller **145** is configured to cause an alert to be output based on a determination that the quantity of the cleaning

fluid accommodated within the cleaning fluid tank **107** is below of predetermined quantity.

[0059] In some embodiments, handle **105** includes hooks **309***a* and **309***b* around which an optional power cord is capable of being wrapped. At least one of the hooks **309***a* or **309***b* is rotatably attached to handle **105** to cause a cord wrapped around the hooks **309***a* and **309***b* to fall toward the ground based on a position of hook **309***a* or **309***b*.

[0060] Handle **105** is rotatably coupled with body **101** by a U-joint, rocker, ball, or other suitable coupling that allows for multi-axial rotation of the handle **105** with respect to body **101**. In some embodiments, handle **105** is configured to rotate about a single axis with respect to body **101**.

[0061] Handle **105** comprises a handle locking mechanism configured to secure the handle **105** in a fixed position with respect to the body **101**. In some embodiments, the handle locking mechanism comprises a slot configured to cooperate with a detent lock, pin, ring or other suitable structure on body **101** configured to at least temporarily restrict the rotation of handle **105** about first axis **129** and/or second axis **131** with respect to body **101**. In some embodiments, the handle locking mechanism comprises a detent lock, pin, ring or other suitable structure configured to cooperate with a slot or other suitable locking member on the body **101** to at least temporarily restrict the rotation of handle **105** about first axis **129** and/or second axis **131** with respect to body **101**.

[0062] In some embodiments, pulling on the handle **105** with at least a predetermined amount of force causes the handle **105** to be released from a locked-state with respect to body **101**. In some embodiments, the handle locking mechanism is configured to release the handle **105** from the locked-state if an end of the handle **105** is pulled in a direction away from body **101** by a force in a range of about 5 lbf to about 25 lbf. In some embodiments, the handle locking mechanism comprises a release pedal, switch, button, or other suitable device configured to release the handle **105** from the locked-state with respect to body **101**.

[0063] In some embodiments, handle **105** has a carry handle **311** between base portion **123** and a point at which handle **105** is coupled with the back side **101***b* of the body **101**. In some embodiments, handle **105** has an upper portion **315** and a lower portion **317**. Upper portion **315** of handle **105** includes mechanical linkage **135**. In some embodiments, each of upper portion **315** and lower portion **317** of handle **105** includes at least a part of mechanical linkage **135**. In some embodiments, at least upper portion **315** of handle **105** is free from including any electrical components or electrical connections with lower portion **317** or any other component of apparatus **100** outside of upper portion **315**. In some embodiments, one of lower portion **317** or base portion **123** includes an actuator **319** communicatively coupled with fluid pump **137** (FIG. **1**). Actuator **319** is configured to interact with mechanical linkage **135** or with an electrical connection between trigger **133** and actuator **319** to cause fluid pump **137** to supply cleaning fluid to the first fluid output **201**.

[0064] In some embodiments, handle **105** has an auxiliary hook **321** on the upper portion **315**. The auxiliary hook **321** is configured to hold a portion of a power cord associated with the apparatus **100** along handle **105**. Holding the power cord along the upper portion **315** of handle **105** helps to improve a user's ability to operate the apparatus **100** by preventing tangling of the power cord or a user from tripping over the power cord, for example.

[0065] In some embodiments, body **101** has one or more side brushes **323** attached to one or more sidewalls of body **101** adjacent agitator cavity **211** (FIG. **2**). Optional side brushes **323** are configured to help loosen debris on a surface opposite the bottom side **101***d* of body **100**. In some embodiments, one or more of the side brushes **323** are stationary. In some embodiments, one or more of the side brushes **323** are configured to one or more of move, rotate, or extend away from body **101**. In some embodiments, controller **145** is configured to cause one or more of the side brushes **323** to extend away from body **101** and/or more or rotate based on a selected operation mode. A movable or extendable side brush **323**, for example, helps a user operate apparatus **100** in hard-to-reach places such as under furniture, corners in a room, along floor boards, under cabinetry, or other difficult to access locations.

[0066] FIG. **4** is a top side perspective view of apparatus **100**, with cleaning fluid tank **107** (FIG. **1**) and recovery tank **109** (FIG. **1**) removed, in accordance with some embodiments. First fluid coupling **401** is on a top side of base portion **123**. Base portion **123** includes a first tank seat **403** configured to accommodate cleaning fluid tank **107**. The first tank seat **403** includes first fluid coupling **401**. Handle **105** comprises one or more lock hooks **405** configured to mate with the cleaning fluid tank locking mechanism **151** (FIG. **1**).

[0067] In some embodiments, body **101** has one or more lights **407** on an exterior of the body **101**. The lights **407** are communicatively coupled with the controller **145**. In some embodiments, an alert output by the controller **145** causes one or more of lights **407** to turn on based on a determination that the quantity of the fluid accommodated within the cleaning fluid tank **107** is below a predetermined quantity. In some embodiments, an alert output by the controller **145** causes one or more of lights **407** to turn on based on a determination that the quantity of the fluid accommodated within the recovery tank **109** is above a predetermined quantity. In some embodiments, an alert output by the controller **145** causes one or more of lights **407** to turn on based on a determination that agitator **203** (FIG. **2**) is jammed. In some embodiments, the controller **145** is configured to cause the vacuum motor **143** (FIG. **1**) to stop based on a determination that the actuator **203** is jammed.

[0068] The fluid pump **137** (FIG. **1**) is communicatively coupled with the first fluid coupling **401** by a tube **409**. A bridge **411** around which the tube **409** extends is inside body **101**. The bridge **411** is a three-dimensional structure having a size and shape configured to maintain a minimum radius around which the tube **409** curves between the fluid pump **137** and the first fluid coupling **401**, independent of a position of the handle **105**. By maintaining the minimum radius of curvature of tube **409**, the bridge **411** prevents kinking in the tube **409** which could otherwise cut off fluid flow through tube **409**.

[0069] First fluid coupling **401** comprises a cup-shaped receptacle within which the second fluid coupling **601** (FIG. **6**) of cleaning fluid tank **107** is configured to be placed upon assembly. In some embodiments, first fluid coupling **401** includes a nipple or other suitable structure configured to be inserted into, or mate with, the second fluid coupling **601** of cleaning fluid tank **107** to communicatively couple the cleaning fluid tank **107** with the fluid pump **137**. In some embodiments, first fluid coupling **401** includes a pin configured to be inserted into the second fluid coupling **601** of

cleaning fluid tank **107** to cause a valve within the second fluid coupling **601** of cleaning fluid tank **107** to open and cause a cleaning fluid accommodated within the cleaning fluid tank **107** to flow out of the cleaning fluid tank **107** into first fluid coupling **401**.

[0070] In some embodiments, a pin included in the first fluid coupling **401** is an electrical contact that projects upward from a bottom surface of first fluid coupling **401** such that the electrical contact is capable of mating with the second fluid coupling **601** of cleaning fluid tank **107**. In some embodiments, a second electrical contact projects upward from the bottom surface of the first fluid coupling **401** and extends to a height that is less than a height of the pin with respect to the bottom surface of the first fluid coupling **401** such that the second electrical contact is configured to be outside an area of the second fluid coupling **601** of cleaning fluid tank **107** with which the pin is configured to mate. In some embodiments, controller **145** is configured to determine a quantity of cleaning fluid in the cleaning fluid tank **107** based on a capacitance in the cleaning fluid tank **107** or in the first fluid coupling **401** detected using one or more of the pin or the second electrical contact. In some embodiments, the controller **145** is configured to determine the cleaning fluid tank **107** is empty based on a determination that an electrical connection between the pin and the second electrical contact, made by way of cleaning fluid in the space between the pin and the second electrical contact, is broken.

[0071] In some embodiments, base portion **123** includes a sensor **413**. Sensor **413** is configured to detect a distance between a magnet included in cleaning fluid tank **107** such as magnet **303** (FIG. **3**) based on a magnetic field associated with the magnet included in cleaning fluid tank **107**. The controller **145** is configured to determine a quantity of cleaning fluid accommodated within cleaning fluid tank **107** based on the distance between the magnet **303** and sensor **413**.

[0072] Body **101** includes a second tank seat **415** configured to accommodate recovery tank **109**. Second tank seat **415** is a region on the top side **101***c* of body **101** that includes third air passage **117**. In some embodiments, second tank seat **415** is a recessed region on the top side of body **101** within which the recovery tank **109** is configured to be at least partially accommodated to facilitate the communicative coupling between recovery tank **109**, second air passage **113** and third air passage **117**.

[0073] FIG. **5** is a top-side perspective view of the apparatus **100** with the cleaning fluid tank **107** (FIG. **1**), the recovery tank **109** (FIG. **1**), and the nozzle **103** (FIG. **1**) removed, in accordance with some embodiments. Body **101** includes a nozzle reception area **501** on the front side **101***a* of the body **101**. The nozzle reception area **501** includes one or more recesses **503** configured to mate with a portion of nozzle **103** if nozzle **103** is attached. In some embodiments, the one or more recesses **503** are configured to receive upward-facing hooks included on a back-side of nozzle **103**. If the nozzle **103** is attached to body **101**, the one or more recesses **503** are configured to engage the hooks on the back-side of nozzle **103** such that if the apparatus **100** is moved in a forward or backward direction, the nozzle **103** is fixed to the front side **101***a* of body **101**.

[0074] In some embodiments, front-side **101***a* of body **101** includes locking recesses **505** configured to receive movable hooks that are included in a nozzle locking mechanism of nozzle **103**. In some embodiments, the locking recesses **505** are over the first air passage **111**. In some embodiments, the locking recesses **505** are in a different position on body **101**. If over the first air passage **111**, for example, the one or more recesses **503**, locking recesses **505** and nozzle **103** are configured to facilitate an attachment of the nozzle **103** to the body **101** such that if the hooks on the back side of nozzle **103** are first installed in the one or more recesses **503**, the nozzle **103** is capable of rotating toward the locking recesses **505** until the movable hooks of nozzle **103** are inserted into the locking recesses **505** to secure nozzle **103** to body **101**.

[0075] In some embodiments, the front side **101***a* has one or more openings **507** that are each configured to receive a wheel on the back-side of nozzle **103** if nozzle **103** includes a wheel. For example, nozzle **801** (FIG. **8**) includes wheels **807** (FIG. **8**) on a back side thereof that, when nozzle **801** is attached to body **101**, align with openings **507**.

[0076] In some embodiments, body **101** includes a second fluid output **509** on the front side **101***a* of body **101**. The second fluid output **509** is communicatively coupled with the first fluid coupling **401** by way of a fluid flow path extending from the first fluid coupling **401** to the second fluid output **509**. The second fluid output **509** is configured to be sealed unless an accessory attachment such as accessory attachment **1001** (FIG. **10**) is coupled with the second fluid output **509**.

[0077] In some embodiments, the first air passage **111** and the second fluid output **509**, together, define an accessory receptacle configured to receive an accessory attachment coupler such as accessory attachment coupler **1003** (FIG. **3**) to facilitate the provision of cleaning fluid and suction to an attached accessory. In some embodiments, one or more of first air passage **111** or second fluid output **509** are configured to receive and hold an accessory attachment coupler in place by way of a friction fitting. In some embodiments, the front side **101***a* of body **101** has sidewalls that are configured to interact with an accessory attachment locking mechanism such as accessory attachment locking mechanism **7007** (FIG. **7**) to detachably fix the accessory attachment to the first air passage **111** and second fluid output **509**.

[0078] In some embodiments, the accessory attachment receptacle defined by first air passage **111** and second fluid output **509** is configured to receive a single-plug-type accessory attachment coupler to facilitate simple coupling of an attached accessory. In some embodiments, body **101** includes an accessory electrical contact **511** configured to mate with a corresponding electrical coupling included in, or connected to, an accessory attachment coupler to facilitate the provision of power to an attached accessory.

[0079] FIG. **6** is perspective view of cleaning fluid tank **107**, in accordance with some embodiments. Cleaning fluid tank **107** comprises cleaning fluid tank vessel **139** configured to accommodate cleaning fluid, a second fluid coupling **601**, a cap **603**, cleaning fluid tank locking mechanism **151** and a grip cover **605**.

[0080] Cleaning fluid tank vessel **139** comprises one or more sidewalls defining a cavity therein. Cleaning fluid tank vessel **139** is configured to hold a predetermined volume of cleaning fluid comprising one or more of a liquid, a solid, water, a detergent, a gas, or some combination thereof. The one or more sidewalls of cleaning fluid tank vessel **139** comprise one or more of a polymer, a metal, glass, a composite material, or some other suitable material capable

of holding the predetermined volume of cleaning fluid. In some embodiments, at least one sidewall of the one or more sidewalls of cleaning fluid tank vessel **139** comprises a transparent material. In some embodiments, at least one sidewall of the one or more sidewalls of cleaning fluid tank vessel **139** comprises an opaque material. In some embodiments, at least one sidewall of the one or more sidewalls of cleaning fluid tank vessel **139** comprises a translucent material capable of hiding waste material within the cleaning fluid tank vessel **139** from plain view while allowing some light to pass through the cleaning fluid tank vessel **139** such that a volume of cleaning fluid accommodated therein is viewable from outside the cleaning fluid tank vessel **139**.

[0081] The second fluid coupling **601** is configured to be communicatively coupled with first fluid coupling **401** (FIG. **4**) on base portion **123** (FIG. **1**). The second fluid coupling **601** is configured to mate with the first fluid coupling **401** on base portion **123** to facilitate flow of cleaning fluid from the cleaning fluid tank **107** into the first fluid coupling **401** of base portion **123**. In some embodiments, second fluid coupling **601** is configured to be inserted into the first fluid coupling **401** of base portion **123**. Second fluid coupling **601** is on a side of cleaning fluid tank vessel **139** opposite grip cover **605**. In some embodiments, second fluid coupling **601** extends away from the cleaning fluid tank vessel **139**.

[0082] Cap **603** is removably attached to cleaning fluid tank vessel **139**. Second fluid coupling **601** is included in cap **603**. Cap **603** is configured to close an opening in cleaning fluid tank vessel **139** through which cleaning fluid is input into vessel **139**.

[0083] The second fluid coupling **601** is configured to prevent cleaning fluid from flowing out of the cleaning fluid tank vessel **139** unless the second fluid coupling **601** is coupled with the first fluid coupling **401** of base portion **123**. In some embodiments, second fluid coupling **601** comprises a valve that is configured to open upon coupling with the first fluid coupling **401**. In some embodiments, the second fluid coupling **601** comprises a different suitable type of valve or seal that is capable of being opened upon connection with the first fluid coupling on base portion **123**.

[0084] Cleaning fluid tank **601** comprises cleaning fluid tank locking mechanism **151** configured to detachably fix cleaning fluid tank **107** to base portion **123** and shaft **125** (FIG. **1**). In some embodiments, grip cover **605** is a plate attached to an upper-side of cleaning fluid tank vessel **139**. The grip cover **605** is over a portion of cleaning fluid tank locking mechanism **151** and is positioned such that the plate of grip cover **605** is spaced apart from cleaning fluid tank vessel **139**, leaving a gap that is capable of being grabbed by a user holding cleaning fluid tank **107**.

[0085] FIG. **7** is a perspective view of recovery tank **109**, in accordance with some embodiments. Recovery tank **109** comprises recovery tank vessel **141** configured to accommodate a composition comprising one or more of a liquid, a solid, a gas, or a portion of the cleaning fluid output from the cleaning fluid tank **107** (FIG. **1**). Recovery tank **109** includes a sixth air passage **701** configured to be communicatively coupled with the second air passage **113** (FIG. **1**) and a seventh air passage **703** configured to be communicatively coupled with the third air passage **117** (FIG. **1**).

[0086] Recovery tank vessel **141** comprises one or more sidewalls defining a cavity therein. Recovery tank vessel **141** is configured to hold a predetermined volume of the composition comprising one or more of the liquid, solid, gas, or portion of the cleaning fluid. The one or more sidewalls of recovery tank vessel **409** comprise one or more of a polymer, a metal, glass, a composite material, or some other suitable material capable of holding the predetermined volume of composition comprising one or more of the liquid, solid, gas, or portion of the cleaning fluid. In some embodiments, at least one sidewall of the one or more sidewalls of recovery tank vessel **141** comprises a transparent material. In some embodiments, at least one sidewall of the one or more sidewalls of recovery tank vessel **141** comprises an opaque material. In some embodiments, at least one sidewall of the one or more sidewalls of recovery tank vessel **141** comprises a translucent material capable of hiding waste material within the recovery tank vessel **141** from plain view while allowing some light to pass through the recovery tank vessel **141** such that a volume of the composition accommodated therein is viewable from outside the recovery tank vessel **141**.

[0087] Recovery tank **109** comprises an air conduit **705** extending from the sixth air passage **701** to an internal portion of the recovery tank vessel **141**. The air conduit **705** comprises a first flow path **707** that branches into a second flow path **709** and a third flow path **711** that each communicatively couple the internal portion of the recovery tank vessel **141** with the sixth air passage **701**.

[0088] First flow path **707**, second flow path **709** and third flow path **711** are defined by one or more sidewalls of recovery tank vessel **141** that are internal to recovery tank vessel **141**. In some embodiments, the second flow path **709** and the third flow path **711** each end facing an inner sidewall of the recovery tank vessel **141**. The inner sidewall of the recovery tank vessel **141** at which each of the second flow path **709** and the third flow path **711** ends, diverts a direction of flow of the liquid, solid, gas or portion of the fluid drawn into the recovery tank vessel **141** by way of the second flow path **709** and the third flow path **711**. By ending in a direction that is away from a center portion of the interior of the recovery tank vessel **141**, the second flow path **709** and the third flow path **711** are configured to prevent or reduce an amount of foam generated inside the recovery tank vessel **141** as the liquid, solid, gas or portion of the fluid is drawn into the recovery tank vessel **141** by directing the flow away from the center portion of the interior of recovery tank vessel **141**. In some embodiments, the one or more sidewalls that define the first flow path **707**, second flow path **709** and third flow path **711** split air flow **712** received from first flow path **707** into two separate flow quantities to reduce the amount of air flowing into a single region of the recovery tank vessel **141** to prevent or reduce an amount of foam generated inside the recovery tank **109**.

[0089] In some embodiments, recovery tank **109** includes a stopper **713** inside the recovery tank vessel **141**. The stopper **713** is configured to at least substantially seal the seventh air passage **703**, or a conduit leading to seventh air passage to prevent flow of air to seventh air passage **703**, based, at least in part, on a volume of the liquid, solid, gas or portion of the fluid composition accommodated by the recovery tank vessel **141**. In some embodiments, the stopper **713** comprises a flotation device that is configured to move along a column **715** toward or away from an opening **717** at an end of column **715**. Opening **717** is communicatively coupled with seventh air passage **703** by a channel **719** internal to column **715**. Stopper **713** is configured to rise toward opening **717** based on a volume of the liquid, solid,

gas or portion of the fluid composition accommodated by the recovery tank vessel **141**. In some embodiments, stopper **713** comprises some other suitable structure configured to substantially seal one or more of opening **717** or seventh air passage **703** based on one or more of a depth of the composition accommodated by recovery tank vessel **141** or a suction of air through seventh air passage **703** by vacuum motor **143** (FIG. **1**).

[0090] In some embodiments, stopper **713** comprises a depth indicator detectable by controller **145** (FIG. **1**). The depth indicator of stopper **713** comprises one or more of a sensor, an electrical contact, or other suitable device configured to be communicatively coupled with the controller **145** to sense whether the stopper **713** is in position to substantially seal the seventh air passage **703**, or a predetermined distance away from a bottom of recovery tank vessel **141**, indicative of a depth of the composition accommodated within recovery tank vessel **141**.

[0091] In some embodiments, the controller of the body **101** is configured to determine the recovery tank is full based on a determination that the stopper **713** is in position to substantially seal the seventh air passage **703** or if the stopper **713** is a predetermined distance away from the bottom of the recovery tank vessel **141**. In some embodiments, the controller **145** is configured to cause the vacuum motor **143** to turn off or an alert to be output indicating that the recovery tank **109** is full.

[0092] In some embodiments, one or more of stopper **713** or column **715** is removable by way of a cap **721** on the bottom side of recovery tank vessel **141**. The seventh air passage **703** is through cap **721**. Cap **721** is configured to mate with a recessed region surrounding third air passage **117** to facilitate the communicative coupling of seventh air flow passage **703** with third air passage **117** if recovery tank **109** is in second tank seat **415** (FIG. **4**).

[0093] Recovery tank **109** comprises a drain cap **723** configured to close a drain opening on the top side of recovery tank **109** defined by one or more sidewalls of recovery tank vessel **141**.

[0094] Recovery tank **109** comprises a handle **725** attached to recovery tank vessel **141**. In some embodiments, handle **725** is integrally formed with recovery tank vessel **141**.

[0095] FIG. **8** is a side view of a carpet cleaning nozzle **801**, in accordance with some embodiments. Nozzle **801** is usable as nozzle **103** (FIG. **1**). Nozzle **801** comprises fourth air passage **119**, fifth air passage **121**, a skid portion **803**, at least one wheel **805**, nozzle hooks **807** and a nozzle locking mechanism **809**. Fourth air passage **119** is communicatively coupled with fifth air passage **121** by way of a channel **811** inside nozzle **801**.

[0096] Nozzle locking mechanism **809** comprises movable hooks **813** that are configured to engage locking recesses **505** (FIG. **5**). Movable hooks **813** are one or more of deformable or spring-loaded to facilitate insertion, locking, and unlocking of nozzle **801** upon attachment to body **101** (FIG. **1**). Nozzle locking mechanism **809** includes a release member on a top side of nozzle **801** to cause movable hooks **813** to deform or retract from an extended position to facilitate the unlocking and removal of nozzle **801** from body **101**.

[0097] The skid portion **803** and the one or more wheels **805** are configured to promote movement of the nozzle **801** and the body **101** over a carpeted surface to facilitate extraction of fluid and/or debris from the carpeted surface into fourth air passage **119** to fifth air passage **121** and into the recovery tank **109** (FIG. **1**).

[0098] FIG. **9** is a side view of a hard surface nozzle **901**, in accordance with some embodiments. Nozzle **901** is usable as nozzle **103** (FIG. **1**). Nozzle **901** comprises fourth air passage **119**, fifth air passage **121**, a squeegee **903**, nozzle hooks **905** and a nozzle locking mechanism **907**. In some embodiments, squeegee **903** comprises a plurality of structures **909** extending from a base portion of squeegee **903** in a direction away from fourth air passage **119**. Fourth air passage **119** is communicatively coupled with fifth air passage **121** by way of a channel **911** inside nozzle **801**.

[0099] Nozzle locking mechanism **907** comprises movable hooks **913** that are configured to engage locking recesses **505** (FIG. **5**). Movable hooks **913** are one or more of deformable or spring-loaded to facilitate insertion, locking, and unlocking of nozzle **901** upon attachment to body **101** (FIG. **1**). Nozzle locking mechanism **909** includes a release member on a top side of nozzle **901** to cause movable hooks **913** to deform or retract from an extended position to facilitate the unlocking and removal of nozzle **901** from body **101**.

[0100] The squeegee **903** and the structures **909** extending away from the fourth air passage **119** are configured to promote a drawing or pushing of cleaning fluid and/or debris on a hard surface over which apparatus **100** is positioned toward fourth air passage **119** to facilitate extraction of fluid and/or debris from the hard surface into fourth air passage **119** to fifth air passage **121** and into the recovery tank **109** (FIG. **1**).

[0101] FIG. **10** is a perspective view of an accessory attachment **1001**, in accordance with some embodiments. Accessory attachment **1001** comprises an accessory coupler **1003** and a brush head **1005** communicatively coupled with the accessory coupler **1003** by way of a vacuum hose **1007** and a fluid line internal to the vacuum hose **1007**. In some embodiments, the fluid line is external to the vacuum hose **1007**. Accessory coupler **1003** is configured to be inserted into first air passage **111** (FIG. **5**) and second fluid output **501** (FIG. **5**). Accessory coupler **1003** includes an accessory air passage **1009** and an accessory fluid coupling **1011** configured to mate with the first air passage **111** and the second fluid output **501**, respectively. In some embodiments, accessory coupler **1003** is configured to be attached to first air passage **111** and/or second fluid output **501** by way of a press-fit. In some embodiments, accessory coupler **1003** includes an accessory locking mechanism **1013** configured to removably attach the accessory coupler **1003** to body **101**. Accessory locking mechanism **1013** comprises movable hooks **1015** that are configured to engage corresponding recesses or sidewalls surrounding or near first air passage **111**. Movable hooks **1015** are one or more of deformable or spring-loaded to facilitate insertion, locking, and unlocking of accessory coupler **1003** upon attachment to body **101** (FIG. **1**). Accessory locking mechanism **1013** includes at least one release member on a sidewall of accessory coupler **1003** to cause movable hooks **1015** to deform or retract from an extended position to facilitate the unlocking and removal of accessory attachment **1001** from body **101**.

[0102] In use, if the mode selection switch **301** (FIG. **3**) is in a position corresponding to a mode associated with using accessory attachment **1001**, and accessory attachment coupler **1003** is coupled with second fluid output **501**, fluid is

supplied to accessory attachment **1001**. Fluid is input into the fluid line that is internal or external to vacuum hose **1007**. Brush head **1005** has a fluid release valve communicatively coupled with an accessory trigger **1017** that, when the accessory trigger **1009** is actuated, and cleaning fluid is in the fluid line, cleaning fluid is caused to be expelled from an accessory fluid output **1019** in the brush head **1005**.

[0103] Brush head **1005** comprises bristles **1021**. In some embodiments, bristles **1021** are stationary. In some embodiments, accessory attachment **1001** comprises a motor configured to cause bristles **1021** to move. In some embodiments, accessory coupler **1003** includes an accessory electrical contact electrically coupled with the motor that is configured to be coupled with optional electrical contact **511** (FIG. **5**) to supply power to the motor in brush head **1005**. In some embodiments, brush head **1005** includes a spin brush in addition to, or in place of, bristles **1021**.

[0104] FIG. **11** is a schematic diagram of a control system **1100**, in accordance with some embodiments. Control system **1100** is included in apparatus **100** (FIG. **1**). In control system **1100**, controller **145** is communicatively coupled with fluid pump **137**, vacuum motor **143**, optional headlight **147**, fluid control switch **149**, agitator motor **205**, mode selection switch **301**, one or more indicator lights **407**, optional accessory electrical contact **511**, and a sensor package **1101**.

[0105] Controller **145** is configured to turn the vacuum motor **143** on or off based on a position of mode selection switch **301**. Mode selection switch **301** is configured to be in one of at least two positions. In some embodiments, mode selection switch **301** is configured to be in one of at least three positions. In some embodiments, apparatus **100** include a power switch that is separate from mode selection switch **301**. In some embodiments, mode selection switch **301** is configured to be used as a power switch in addition to a switch for designating an operation mode of apparatus **100**.

[0106] Controller **145** is configured to one or more of cause power to be supplied to the agitator motor **205** or output an instruction to the agitator motor **205** based on the position of the mode selection switch **301**. In some embodiments, actuator **319** (FIG. **3**) is communicatively coupled with controller **145** such that when the trigger **133** (FIG. **1**) is actuated, controller **145** causes the agitator motor **145** to move agitator **203** (FIG. **2**).

[0107] In some embodiments, the controller **145** is configured to cause power to be supplied to the optional accessory electrical contact **511** based on the position of the mode selection switch **301**.

[0108] In some embodiments, mode selection switch **301** is configured to be in one of three positions. In a first position, apparatus **100** is off. In a second position, the vacuum motor **143** is turned on, the agitator motor **205** is capable of being turned on, and the fluid pump **137** is caused to supply cleaning fluid to the first fluid output **201** (FIG. **2**) based on a position of the fluid control switch **149**. In a third position, the vacuum motor **143** is turned on, the agitator motor **205** is turned off, and the fluid pump **137** is caused to supply cleaning fluid to the second fluid output **501** at a predetermined rate independent of the position of the fluid control switch **149**.

[0109] In some embodiments, controller **145** is configured to cause fluid to flow from the cleaning fluid tank **107** (FIG. **1**) to the first fluid output **201** by way of the first fluid coupling **401** based on a position of the mode selection switch **301** and an actuation of trigger **133** included in handle **105**. Based on the actuation of the trigger **133**, with the mode selection switch in a corresponding position, controller **145** is configured to cause fluid pump **137** to draw cleaning fluid from cleaning fluid tank **107**.

[0110] In some embodiments, indicator lights **407** comprise an agitator status indicator communicatively coupled with the controller **145**. The agitator motor **205** comprises an agitator movement sensor communicatively coupled with the controller **145**. Controller **145** is configured to determine whether the agitator **203** is moving based on data received from the agitator movement sensor. In some embodiments, the controller **145** is configured to one or more of cause power to stop being supplied to the agitator motor **205**, cause the agitator status indicator to be activated based on a determination the agitator **203** is not moving, or cause power to stop being supplied to the vacuum motor **143**.

[0111] In some embodiments, indicator lights **407** comprise a cleaning fluid tank status indicator communicatively coupled with the controller **145**. Controller **145** is configured to determine a volume of cleaning fluid in the cleaning fluid tank **107** based on one or more of data received from sensor **413** (FIG. **4**) or a conduction of electricity through the cleaning fluid in the cleaning fluid tank **107** by way of the first fluid coupling **401**. Controller **145** is configured to cause the tank status indicator to be activated based on the volume of cleaning fluid included in the cleaning fluid tank **107**. In some embodiments, if the volume of cleaning fluid in cleaning fluid tank **107** is less than a predetermined threshold, the controller **145** is configured to cause the tank status indicator light to turn on. In some embodiments, if the volume of cleaning fluid in cleaning fluid tank **107** is less than a predetermined threshold, the controller **145** is configured to cause the tank status indicator light to turn off.

[0112] In some embodiments, indicator lights **407** comprise a recovery tank status indicator communicatively coupled with the controller **145**. Controller **145** is configured to determine a volume of fluid and/or debris in the recovery tank **109** based on data received from a sensor included in stopper **713** (FIG. **7**) or on a determination that the vacuum motor **143** is under stress, indicating a clog or that the stopper **713** has at least substantially sealed seventh air passage **703** (FIG. **7**). Controller **145** is configured to cause the recovery tank status indicator to be activated based on the volume of fluid and/or debris included in the recovery tank **109**. In some embodiments, if the volume of fluid and/or debris included in recovery tank **109** is greater than a predetermined threshold, the controller **145** is configured to cause the tank status indicator light to turn on. In some embodiments, if the volume of fluid and/or debris included in recovery tank **109** is greater than a predetermined threshold, the controller **145** is configured to cause the tank status indicator light to turn off.

[0113] Indicator lights **407** are positioned on apparatus **100** such that a user operating the apparatus **100** is able to quickly and easily identify a problem or operating status of the apparatus **100**, increasing a user's confidence in the user's ability to operate the apparatus **100**, and increasing a user's confidence in identifying whether the apparatus **100** should be filled with cleaning fluid, emptied, serviced, or some other suitable operation capable of being instigated by way of an indicator light.

[0114] Sensor package **1101** comprises one or more of sensor **413**, a position sensor, a gps, a gyroscope, or other sensor suitable for collecting data indicative of a location or a direction of movement of the apparatus to be processed by controller **145**.

[0115] FIG. **12** is a diagram of a fluid flow system **1200**, in accordance with some embodiments. Fluid flow system **1200** includes a plurality of fluid flow paths **1201***a*-**1201***g* that communicatively couple the first fluid coupling **401**, the fluid pump **137**, the first fluid output **201**, and the second fluid output **501**.

[0116] By way of example, fluid flow paths **1201***a*-**1201***g* communicatively couple first fluid coupling **401**, a three-way connector **1205**, fluid pump **137**, first fluid output **201**, second fluid output **501**, and a check valve **1215**. Each fluid flow path **1201***a*-**1201***g* comprises one or more of a tube, a hose, a pipe, a nozzle, a valve, a fluid coupler, or some other suitable via through which fluid is capable of moving.

[0117] Fluid pump **137** is communicatively coupled with controller **145** (FIG. **1**). In use, fluid pump **137** causes cleaning fluid to be drawn from fluid flow path **1201***b*. The cleaning fluid drawn from fluid flow path **1201***b* comprises one or more of cleaning fluid directly drawn from cleaning fluid tank **107** (FIG. **1**) by way of first fluid coupling **401**, fluid flow path **1201***a*, and three-way connector **1205**, or cleaning fluid that was drawn from cleaning fluid tank **107**, circulated through fluid flow paths **1201***b*, **1201***c*, **1201***e*, **1201***f* and **1201***g*, and received by thee three-way connector **1205**.

[0118] The cleaning fluid drawn from cleaning fluid tank **107** is drawn into an inlet of fluid pump **137** and output to fluid flow path **1201***c* from an outlet of fluid pump **137**.

[0119] In a first operation mode, the controller **145** is configured to cause fluid pump **137** to supply fluid to fluid supply line **1201***c* at a rate based on a position of flow control switch **149**. In a second operation mode, the controller **145** is configured to cause fluid pump **137** to supply fluid to fluid supply line **1201***c* at a rate independent of a position of flow control switch **149**.

[0120] In some embodiments, fluid flow system **1200** includes an optional fluid diverter **127** at a junction between fluid flow path **1201***c* and fluid flow paths **1201***d* and **1201***e*. If included, the fluid diverter **1217** is communicatively coupled with controller **145** to cause fluid to flow to fluid flow path **1201***d* such that the cleaning fluid output by fluid pump **137** is expelled from first fluid output **201** in the first operation mode, and to cause fluid to flow to fluid flow path **1201***e* such that the cleaning fluid output by fluid pump **137** is supplied to the second fluid output **501** in the second operation mode.

[0121] In some embodiments, fluid flow system **1200** includes an optional controllable valve **1219** communicatively coupled with controller **145** and positioned between fluid pump **137** and first fluid output **201**. If included, controllable valve **1219** is configured to open or close fluid flow passage **1201***d* to cause fluid output by fluid pump **137** to flow in fluid supply line **1201***e* such that fluid is supplied to the first fluid output **201** in the first operation mode and cut off from being supplied to the first fluid output **201** in the second operation mode.

[0122] An inlet **1213***a* of second fluid output **501** is communicatively coupled with fluid flow path **1201***e*. A fluid system outlet **1213***b* of second fluid output **501** is communicatively coupled with fluid flow path **1201***f*. In use, if the second fluid output **501** is not coupled with an external accessory, the second fluid output **501** is configured to cause cleaning fluid to flow from fluid flow path **1201***e* to fluid flow path **1201***f*. If the second fluid output **501** is coupled with an external accessory, the second fluid output **501** is configured to allow cleaning fluid to flow out of the second fluid output **501** and into an accessory attachment coupler such as accessory attachment coupler **1003** (FIG. **10**) that is coupled with body **101** by way of second fluid output **501**.

[0123] An inlet of check valve **1215** is communicatively coupled with fluid system outlet **1213***b* by way of fluid flow path **1201***f*. An outlet of check valve **1215** is communicatively coupled with three-way connector **1205** by way of fluid flow path **1201***g*. In use, if the second fluid output **501** free from being coupled with an accessory attachment, and the fluid diverter **1217** is diverting flow to fluid flow path **1201***e* or the controllable valve **1219** is cutting off fluid flow to the first fluid output **201**, cleaning fluid output by fluid pump **137** is caused to flow into fluid flow path **1201***f*. If pressure builds in fluid flow path **1201***f* to a point that a threshold pressure is breached, the check valve **1215** will open to cause cleaning fluid to flow into fluid flow path **1201***g*.

[0124] In some embodiments, if the second fluid output **501** is coupled with an accessory, check valve **1215** is configured to allow pressure to build within fluid flow path **1201***f* to a point that second fluid output **501** causes cleaning fluid to flow into an attached accessory coupler by way of second fluid output **501**. If the attached accessory is in a state in which cleaning fluid is not being output by the accessory, pressure continues to build in fluid flow path **1201***f* until the threshold pressure is reached. Upon reaching the threshold pressure with the accessory attached to the accessory fluid coupling, check valve **1215** will open to cause cleaning fluid to flow into fluid flow path **1201***g*.

[0125] Three-way connector **1205** is configured to receive cleaning fluid from fluid flow path **1201***a* and fluid flow path **1201***g*. In some embodiments, three-way connector is configured to output fluid received from fluid flow path **1201***a*, fluid flow path **1201***g* or a mixture thereof to fluid flow path **1201***b*. In some embodiments, three-way connector **1205** is a valve. In some embodiments, three-way connector is reliant on pressure in fluid flow path **1201***g* resulting from fluid pump **137**, for example, or pressure in fluid flow path **1201***a* caused by the relative height of the cleaning fluid in cleaning fluid tank **107** with respect to three-way connector **1205**, for example, to facilitate whether fluid pump **137** will receive cleaning fluid directly drawn from cleaning fluid tank **107**, recirculated cleaning fluid that was drawn from cleaning fluid tank **107**, or some combination thereof.

[0126] In some embodiments, check valve **1215** is included in three-way connector **1205**, and fluid flow paths **1201***f* and **1201***g* are a continuous path free from having an intermediary component between second fluid output **501** and three-way connector **1205**.

[0127] In some embodiments, second fluid output **501** comprises a fluid diverter, valve or other suitable structure configured to direct fluid flow from the inlet **1213***a* to the second fluid output **501** based on the second fluid output **501** being coupled with an accessory such that the flow of fluid into the attached accessory coupler is free from being reliant on back pressure from check valve **1215**. In some embodi-

ments, fluid pump **137** is configured to turn off if a fluid pressure in at least fluid flow path **1201***c* is greater than a predetermined threshold.

[0128] In some embodiments, fluid flow system **1200** is free from including a recirculation loop. In some embodiments, fluid flow system **1200** is free from including fluid flow paths **1201***b*, **1201***f* and **1201***g*, three-way connector **1205**, fluid system output **1213***b* and check valve **1215**, and first fluid coupling **401** is connected to fluid pump **137** by fluid flow path **1201***a*.

[0129] FIG. **13** is a flowchart of a method **1300**, in accordance with some embodiments. In some embodiments, one or more steps of method **1300** is implemented by apparatus **100** (FIG. **1**) or a processor included in chipset **1400** (FIG. **14**).

[0130] In step **1301**, a controller causes power to be supplied to a vacuum motor based on a mode selection switch being in a first operation position, a second operation position or a third operation position.

[0131] In step **1303**, a fluid accommodated by a first tank is drawn from the first tank based on the switch being in the second operation position or the third operation position. In some embodiments, an indicator light is caused to turn on if the quantity of fluid accommodated in the first tank is less than a predetermined threshold value.

[0132] In step **1305**, fluid drawn from the first tank is output by a fluid pump at a rate corresponding to a position of a fluid flow control switch and/or the position of the mode selection switch.

[0133] In step **1307**, the fluid drawn from the first tank is expelled from a first fluid output communicatively coupled with the first tank if the mode selection switch is in the second position. In some embodiments, an agitator motor communicatively coupled with the controller and configured to cause an agitator to move is activated if the mode selection switch is in the second position. In some embodiments, the controller causes the agitator motor to move the agitator if the mode selection switch is in the second position and a fluid release trigger is actuated. In some embodiments, the controller detects whether the agitator motor is capable of causing the agitator to move, for example if the agitator is jammed, while the agitator motor is activated and the mode selection switch is in the second position. If the agitator is incapable of moving, the controller causes one or more of the agitator motor, the vacuum motor or the fluid pump that draws the fluid from the first tank to be inactivated while the mode selection switch is in the second position. In some embodiments, the controller causes an indicator light to turn on based on the detection that the agitator motor is incapable of causing the agitator to move.

[0134] In step **1309** the fluid drawn from the first tank is expelled from a second fluid output communicatively coupled with the first tank if the mode selection switch is in the third position. In some embodiments, the second fluid output is closed unless an accessory coupler is attached to the second fluid output. In some embodiments, power is supplied to an electrical contact associated with the second fluid output based on a determination the fluid coupling is attached to the second fluid output and/or the mode selection switch is in the third position.

[0135] In step **1311**, fluid drawn from the first tank is optionally recirculated to a first tank side of fluid pump if the mode selection switch is in the third position and the second fluid output is closed.

[0136] In step **1313** the vacuum motor causes one or more of air, debris, a liquid or a portion of the fluid to be drawn into a second tank separate from the first tank.

[0137] FIG. **14** is a functional block diagram of a computer or processor-based system **1400** upon which or by which an embodiment is implemented.

[0138] Processor-based system **1400** is programmed to cause a fluid extraction system such as apparatus **100** to operate as described herein, and includes, for example, bus **1401**, processor **1403**, and memory **1405** components.

[0139] In some embodiments, the processor-based system **1400** is implemented as a single "system on a chip." Processor-based system **1400**, or a portion thereof, constitutes a mechanism for performing one or more steps of operating a liquid extraction system.

[0140] In some embodiments, the processor-based system **1400** includes a communication mechanism such as bus **1401** for transferring information and/or instructions among the components of the processor-based system **1400**. Processor **1403** is connected to the bus **1401** to obtain instructions for execution and process information stored in, for example, the memory **1405**. In some embodiments, the processor **1403** is also accompanied with one or more specialized components to perform certain processing functions and tasks such as one or more digital signal processors (DSP), or one or more application-specific integrated circuits (ASIC). A DSP typically is configured to process real-world signals (e.g., sound) in real time independently of the processor **1403**. Similarly, an ASIC is configurable to perform specialized functions not easily performed by a more general purpose processor. Other specialized components to aid in performing the functions described herein optionally include one or more field programmable gate arrays (FPGA), one or more controllers, or one or more other special-purpose computer chips.

[0141] In one or more embodiments, the processor (or multiple processors) **1403** performs a set of operations on information as specified by a set of instructions stored in memory **1405** related to operating a liquid extraction system. The execution of the instructions causes the processor to perform specified functions.

[0142] The processor **1403** and accompanying components are connected to the memory **1405** via the bus **1401**. The memory **1405** includes one or more of dynamic memory (e.g., RAM, magnetic disk, writable optical disk, etc.) and static memory (e.g., ROM, CD-ROM, etc.) for storing executable instructions that when executed perform the steps described herein to operate a liquid extraction system. The memory **1405** also stores the data associated with or generated by the execution of the steps.

[0143] In one or more embodiments, the memory **1405**, such as a random access memory (RAM) or any other dynamic storage device, stores information including processor instructions for operating a liquid extraction system. Dynamic memory allows information stored therein to be changed by system **1400**. RAM allows a unit of information stored at a location called a memory address to be stored and retrieved independently of information at neighboring addresses. The memory **1405** is also used by the processor **1403** to store temporary values during execution of processor instructions. In various embodiments, the memory **1405** is a read only memory (ROM) or any other static storage device coupled to the bus **1401** for storing static information, including instructions, that is not changed by the system

1400. Some memory is composed of volatile storage that loses the information stored thereon when power is lost. In some embodiments, the memory **1405** is a non-volatile (persistent) storage device, such as a magnetic disk, optical disk or flash card, for storing information, including instructions, that persists even when the system **1400** is turned off or otherwise loses power.

[0144] The term "computer-readable medium" as used herein refers to any medium that participates in providing information to processor **1403**, including instructions for execution. Such a medium takes many forms, including, but not limited to computer-readable storage medium (e.g., non-volatile media, volatile media). Non-volatile media includes, for example, optical or magnetic disks. Volatile media include, for example, dynamic memory. Common forms of computer-readable media include, for example, a floppy disk, a flexible disk, a hard disk, a magnetic tape, another magnetic medium, a CD-ROM, CDRW, DVD, another optical medium, punch cards, paper tape, optical mark sheets, another physical medium with patterns of holes or other optically recognizable indicia, a RAM, a PROM, an EPROM, a FLASH-EPROM, an EEPROM, a flash memory, another memory chip or cartridge, or another medium from which a computer can read. The term computer-readable storage medium is used herein to refer to a computer-readable medium.

[0145] An aspect of this description is related to an apparatus comprising a body, a nozzle, a handle, a first tank, a second tank, a vacuum motor, a fluid pump and a controller. The body comprises one or more sidewalls defining a front side, a back side, a top side and a bottom side of the body. The body also comprises a first fluid output, a first air passage, a second air passage communicatively coupled with the first air passage, and a third air passage. The nozzle is removably attached to the front side of the body. The nozzle comprises a fourth air passage proximate the bottom side of the body and a fifth air passage proximate the top side of the body. The fifth air passage is communicatively coupled with the fourth air passage. The nozzle is attached to the body such that the first air passage and the fifth air passage are substantially aligned. The handle is coupled with the body. The handle comprises a base portion comprising a first fluid coupling communicatively coupled with the first fluid output, a shaft coupled with the base portion, and a grip portion at an end of the shaft opposite the base portion. The first tank is over the base portion. The first tank comprise a first vessel configured to accommodate a fluid, and a second fluid coupling communicatively coupled with the first fluid coupling. The second tank is over the body. The second tank comprises a second vessel separated from the first vessel, a sixth air passage communicatively coupled with the second air passage, and a seventh air passage communicatively coupled with the third air passage. The vacuum motor is in the base portion of the handle. The vacuum motor has an inlet communicatively coupled with the third air passage. The fluid pump is in the body. The fluid pump is communicatively coupled with the first fluid coupling and the first fluid output. The controller is in the body. The controller is communicatively coupled with the vacuum motor and the fluid pump. The controller is configured to activate the fluid pump to cause fluid contained in the first tank to be supplied to the first fluid output. The controller is also configured to activate the vacuum motor to draw one or more of air, debris, a liquid or a portion of the fluid into the second tank by way of the first air passage.

[0146] Another aspect of this description is related to an apparatus comprising a body, a nozzle, a handle, a first tank, a second tank, a vacuum motor, a fluid pump and a controller. The body comprises a housing, a first fluid output, a first air passage, a second air passage communicatively coupled with the first air passage, and a third air passage. The nozzle is removably attached to the housing. The nozzle comprises a fourth air passage and a fifth air passage. The fifth air passage is communicatively coupled with the fourth air passage. The nozzle is attached to the housing such that the first air passage and the fifth air passage are substantially aligned. The handle is coupled with the body. The handle comprises a base portion comprising a first fluid coupling communicatively coupled with the first fluid output, a shaft coupled with the base portion, and a grip portion at an end of the shaft opposite the base portion. The first tank is over the base portion. The first tank comprises a first vessel configured to accommodate a fluid, and a second fluid coupling communicatively coupled with the first fluid coupling. The second tank is over the body. The second tank comprises a second vessel separated from the first vessel. The second tank also comprises a sixth air passage communicatively coupled with the second air passage, and a seventh air passage communicatively coupled with the third air passage. The vacuum motor has an inlet communicatively coupled with the third air passage. The fluid pump is communicatively coupled with the first fluid coupling and the first fluid output. The controller is communicatively coupled with the vacuum motor and the fluid pump. The controller is configured to activate the fluid pump to cause fluid contained in the first tank to be supplied to the first fluid output. The controller is also configured to activate the vacuum motor to draw one or more of air, debris, a liquid or a portion of the fluid into the second tank by way of the first air passage. The second tank comprises an air conduit extending from the sixth air passage to an internal portion of the second vessel of the second tank. The air conduit comprises a first flow path that branches into a second flow path and a third flow path that each communicatively couple the internal portion of the second vessel of the second tank with the sixth air passage.

[0147] A further aspect of this description is related to an apparatus, comprising a body, a nozzle, a handle, a first tank, a second tank, a vacuum motor, a fluid pump and a controller. The body a housing, a first fluid output, a first air passage, a second air passage communicatively coupled with the first air passage, and a third air passage. The nozzle is removably attached to the housing. The nozzle comprises a fourth air passage and a fifth air passage. The fifth air passage is communicatively coupled with the fourth air passage. The nozzle is attached to the housing such that the first air passage and the fifth air passage are substantially aligned. The handle is coupled with the body. The handle comprises a base portion comprising a first fluid coupling communicatively coupled with the first fluid output, a shaft coupled with the base portion, and a grip portion at an end of the shaft opposite the base portion. The first tank is over the base portion. The first tank comprises a first vessel configured to accommodate a fluid, and a second fluid coupling communicatively coupled with the first fluid coupling. The second tank is over the body. The second tank

comprises a second vessel separated from the first vessel, a sixth air passage communicatively coupled with the second air passage, and a seventh air passage communicatively coupled with the third air passage. The vacuum motor has an inlet communicatively coupled with the third air passage. The fluid pump is communicatively coupled with the first fluid coupling and the first fluid output. The controller is communicatively coupled with the vacuum motor and the fluid pump. The controller is configured to activate the fluid pump to cause fluid contained in the first tank to be supplied to the first fluid output, and to activate the vacuum motor to draw one or more of air, debris, a liquid or a portion of the fluid into the second tank by way of the first air passage. The apparatus additionally comprises an agitator and an agitator motor communicatively coupled with the controller. The agitator motor is configured to cause the agitator to move based on an instruction received from the controller. The apparatus further comprises a mode selection switch communicatively coupled with the controller. If the mode selection switch is in a first position, and power is supplied to the controller, the controller is configured to cause the agitator to move and to cause the flow of the fluid to be based on the position of the fluid control switch. If the mode selection switch is in a second position, and power is supplied to the controller, the controller is configured to cause the agitator to be stationary and fluid to be supplied to the second fluid output at a predetermined rate independent of the position of the fluid control switch.

[0148] The foregoing outlines features of several embodiments so that those skilled in the art may better understand the aspects of the present disclosure. Those skilled in the art should appreciate that they may readily use the present disclosure as a basis for designing or modifying other processes and structures for carrying out the same purposes and/or achieving the same advantages of the embodiments introduced herein. Those skilled in the art should also realize that such equivalent constructions do not depart from the spirit and scope of the present disclosure, and that they may make various changes, substitutions, and alterations herein without departing from the spirit and scope of the present disclosure. As such, although features of several embodiments are expressed in certain combinations among the foregoing description and claims, the features or steps discussed with respect to some embodiments can be arranged in any combination or order.

What is claimed is:

1. An apparatus, comprising:

a body comprising:

one or more sidewalls defining a front side, a back side, a top side and a bottom side of the body;

a first fluid output;

a first air passage;

a second air passage communicatively coupled with the first air passage; and

a third air passage;

a nozzle removably attached to the front side of the body, the nozzle comprising a fourth air passage proximate the bottom side of the body and a fifth air passage proximate the top side of the body, the fifth air passage being communicatively coupled with the fourth air passage, the nozzle being attached to the body such that the first air passage and the fifth air passage are substantially aligned;

a handle coupled with the body, the handle comprising:

a base portion comprising a first fluid coupling communicatively coupled with the first fluid output;

a shaft coupled with the base portion; and

a grip portion at an end of the shaft opposite the base portion;

a first tank over the base portion, the first tank comprising:

a first vessel configured to accommodate a fluid; and

a second fluid coupling communicatively coupled with the first fluid coupling;

a second tank over the body, the second tank comprising:

a second vessel separated from the first vessel;

a sixth air passage communicatively coupled with the second air passage; and

a seventh air passage communicatively coupled with the third air passage;

a vacuum motor in the base portion of the handle having an inlet communicatively coupled with the third air passage;

a fluid pump in the body communicatively coupled with the first fluid coupling and the first fluid output; and

a controller in the body communicatively coupled with the vacuum motor and the fluid pump, the controller being configured to activate the fluid pump to cause fluid contained in the first tank to be supplied to the first fluid output, and to activate the vacuum motor to draw one or more of air, debris, a liquid or a portion of the fluid into the second tank by way of the first air passage.

2. The apparatus of claim **1**, further comprising:

a fluid control switch configured to be in one of a plurality of selectable positions,

wherein the controller is configured to cause fluid contained in the first tank to be supplied to the first fluid output at a rate based on the position of the fluid control switch.

3. The apparatus of claim **2**, further comprising:

a second fluid output communicatively coupled with the first fluid coupling,

wherein,

the first air passage and the second fluid output are configured to mate with an accessory connector comprising an accessory fluid coupling and an accessory connector air passage.

4. The apparatus of claim **3**, wherein the second fluid output is located on the front side of the body such that the second fluid output is exposed if the nozzle is detached from the body.

5. The apparatus of claim **3**, further comprising:

an agitator;

an agitator motor communicatively coupled with the controller and configured to cause the agitator to move based on an instruction received from the controller; and

a mode selection switch communicatively coupled with the controller,

wherein

if the mode selection switch is in a first position, and power is supplied to the controller, the controller is configured to cause the agitator to move and to cause the flow of the fluid to be based on the position of the fluid control switch, and

if the mode selection switch is in a second position, and power is supplied to the controller, the controller is configured to cause the agitator to be stationary and

fluid to be supplied to the second fluid output at a predetermined rate independent of the position of the fluid control switch.

6. The apparatus of claim **5**, wherein the controller is configured to cause the vacuum motor to stop based on a determination that the actuator is jammed.

7. The apparatus of claim **1**, wherein the handle is configured to rotate with respect to the body about a first axis and to rotate about a second axis substantially perpendicular to the first axis.

8. The apparatus of claim **9**, further comprising a handle locking mechanism configured to fix the handle with respect to the body.

9. The apparatus of claim **1**, further comprising:

a trigger;

a mechanical linkage inside the shaft extending from the trigger to the base portion of the handle;

a fluid pump communicatively coupled with the first fluid coupling; and

an actuator communicatively coupled with the fluid pump,

wherein the mechanical linkage is configured to contact the actuator based on an actuation of the trigger, and the fluid pump is configured to cause fluid to be supplied to the first fluid output based on the actuation of the trigger and the contact between the mechanical linkage and the actuator.

10. The apparatus of claim **1**, wherein the second tank comprises an air conduit extending from the sixth air passage to an internal portion of the second vessel of the second tank, and the air conduit comprises a first flow path that branches into a second flow path and a third flow path that each communicatively couple the internal portion of the second vessel of the second tank with the sixth air passage.

11. The apparatus of claim **1**, wherein the nozzle comprises a skid portion adjacent to the fourth air passage and at least one wheel on a side of the nozzle opposite to the skid portion with the fourth air passage being between the skid portion and the at least one wheel.

12. The apparatus of claim **1**, wherein the nozzle comprises a squeegee surrounding the fourth air passage, the nozzle having a plurality of structures extending from a base of the squeegee in a direction away from the fourth air passage.

13. The apparatus of claim **1**, wherein

the nozzle is one of a first nozzle or a second nozzle included in a set of nozzles configured to be individually attached to the body,

the first nozzle comprises a skid portion adjacent to the fourth air passage and at least one wheel on a side of the nozzle opposite to the skid portion with the fourth air passage being between the skid portion and the at least one wheel, and

the second nozzle comprises a squeegee surrounding the fourth air passage, the nozzle having a plurality of structures extending from a base of the squeegee in a direction away from the fourth air passage.

14. The apparatus of claim **1**, further comprising:

a fluid pump in the body communicatively coupled with the first fluid coupling by a tube; and

a bridge around which the tube extends,

wherein the bridge is configured to maintain a minimum radius around which the tube curves between the fluid pump and the first fluid coupling independent of a position of the handle.

15. The apparatus of claim **1**, further comprising:

a magnet inside the vessel of the first tank, the magnet being configured to float based on a quantity of the fluid accommodated within the vessel of the first tank; and

a sensor inside the base portion of the handle, the sensor being configured to detect a distance between the magnet and the sensor based on a magnetic field associated with the magnet,

wherein the controller is configured to cause an alert to be output based on the quantity of the fluid accommodated within the vessel of the first tank being below of predetermined quantity.

16. The apparatus of claim **15**, further comprising:

a light on an exterior of the body communicatively coupled with the controller,

wherein the alert comprises causing the light to turn on based on a determination that the quantity of the fluid accommodated within the vessel of the first tank is below a predetermined quantity.

17. The apparatus of claim **1**, wherein the inlet of the vacuum motor is communicatively coupled with the third air passage by way of a hose, and the first fluid coupling is communicatively coupled with the first fluid output by way of a tube inside the hose.

18. The apparatus of claim **1**,

a wherein the first air passage and the second air passage are on ends of a coupler removably attached to one or more sidewalls of the body.

19. An apparatus, comprising:

a body comprising:

a housing;

a first fluid output;

a first air passage;

a second air passage communicatively coupled with the first air passage; and

a third air passage;

a nozzle removably attached to the housing, the nozzle comprising a fourth air passage and a fifth air passage, the fifth air passage being communicatively coupled with the fourth air passage, the nozzle being attached to the housing such that the first air passage and the fifth air passage are substantially aligned;

a handle coupled with the body, the handle comprising:

a base portion comprising a first fluid coupling communicatively coupled with the first fluid output;

a shaft coupled with the base portion; and

a grip portion at an end of the shaft opposite the base portion;

a first tank over the base portion, the first tank comprising:

a first vessel configured to accommodate a fluid; and

a second fluid coupling communicatively coupled with the first fluid coupling;

a second tank over the body, the second tank comprising:

a second vessel separated from the first vessel;

a sixth air passage communicatively coupled with the second air passage; and

a seventh air passage communicatively coupled with the third air passage;

a vacuum motor having an inlet communicatively coupled with the third air passage;

a fluid pump communicatively coupled with the first fluid coupling and the first fluid output; and

a controller communicatively coupled with the vacuum motor and the fluid pump, the controller being configured to activate the fluid pump to cause fluid contained in the first tank to be supplied to the first fluid output, and to activate the vacuum motor to draw one or more of air, debris, a liquid or a portion of the fluid into the second tank by way of the first air passage,

wherein the second tank comprises an air conduit extending from the sixth air passage to an internal portion of the second vessel of the second tank, and the air conduit comprises a first flow path that branches into a second flow path and a third flow path that each communicatively couple the internal portion of the second vessel of the second tank with the sixth air passage.

20. An apparatus, comprising:

a body comprising:

a housing;

a first fluid output;

a first air passage;

a second air passage communicatively coupled with the first air passage; and

a third air passage;

a nozzle removably attached to the housing, the nozzle comprising a fourth air passage and a fifth air passage, the fifth air passage being communicatively coupled with the fourth air passage, the nozzle being attached to the housing such that the first air passage and the fifth air passage are substantially aligned;

a handle coupled with the body, the handle comprising:

a base portion comprising a first fluid coupling communicatively coupled with the first fluid output;

a shaft coupled with the base portion; and

a grip portion at an end of the shaft opposite the base portion;

a first tank over the base portion, the first tank comprising:

a first vessel configured to accommodate a fluid; and

a second fluid coupling communicatively coupled with the first fluid coupling;

a second tank over the body, the second tank comprising:

a second vessel separated from the first vessel;

a sixth air passage communicatively coupled with the second air passage; and

a seventh air passage communicatively coupled with the third air passage;

a vacuum motor having an inlet communicatively coupled with the third air passage;

a fluid pump communicatively coupled with the first fluid coupling and the first fluid output;

a controller communicatively coupled with the vacuum motor and the fluid pump, the controller being configured to activate the fluid pump to cause fluid contained in the first tank to be supplied to the first fluid output, and to activate the vacuum motor to draw one or more of air, debris, a liquid or a portion of the fluid into the second tank by way of the first air passage;

an agitator;

an agitator motor communicatively coupled with the controller and configured to cause the agitator to move based on an instruction received from the controller; and

a mode selection switch communicatively coupled with the controller, wherein

if the mode selection switch is in a first position, and power is supplied to the controller, the controller is configured to cause the agitator to move and to cause the flow of the fluid to be based on the position of the fluid control switch, and

if the mode selection switch is in a second position, and power is supplied to the controller, the controller is configured to cause the agitator to be stationary and fluid to be supplied to the second fluid output at a predetermined rate independent of the position of the fluid control switch.

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