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(54) **APPARATUS FOR USE WITH HYDROVAC TRUCK**

(71) Applicant: **Bryan Kevin Engelking**, Bruderheim (CA)

(72) Inventor: **Bryan Kevin Engelking**, Bruderheim (CA)

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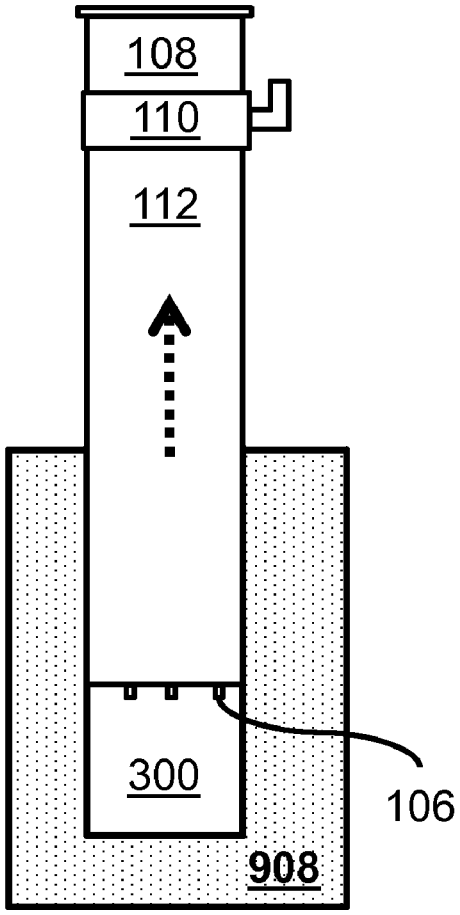
(57) **ABSTRACT**

An apparatus is for use with a hydrovac truck having a vacuum assembly for connection to a holding tank, with a water supply configured to provide pressurized flowing water. Apparatus includes an elongated hollow assembly configured to be fluidly connectable with the vacuum assembly. A water jet assembly is mounted to the elongated hollow assembly. The water jet assembly is configured to be fluidly connectable with the water supply, so that the water jet assembly ejects pressurized flowing water toward the soil. Pressurized flowing water cuts into the soil, and urges formation of a slurry. Pressurized flowing water moves the water jet assembly along a circular path outlined by a cross-section of the elongated hollow assembly in the soil while the elongated hollow assembly and the water jet assembly move deeper into the soil. The vacuum assembly moves the slurry along the elongated hollow assembly and toward the holding tank.



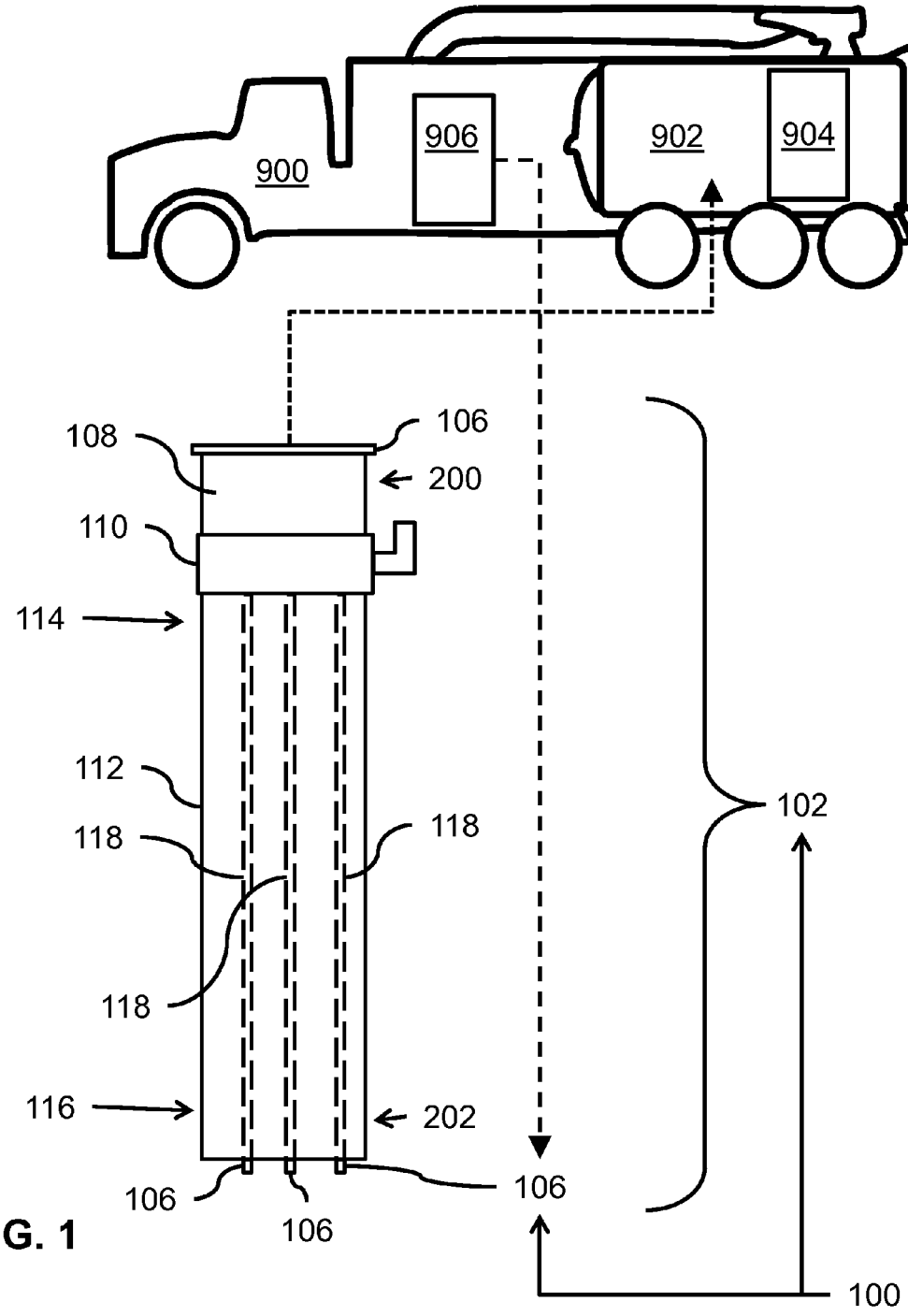

900
906
902
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FIG. 1

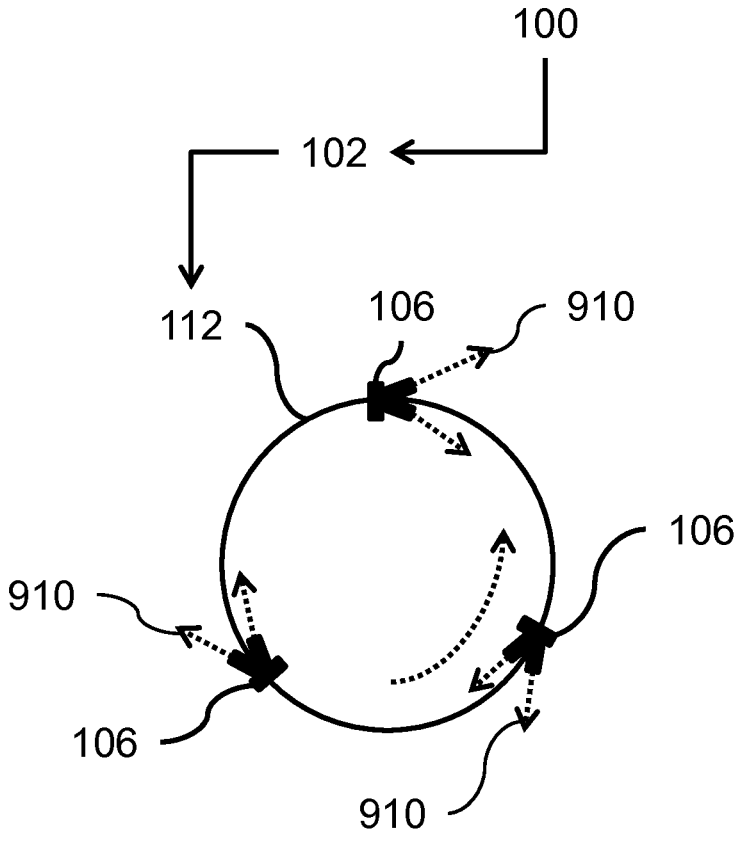

FIG. 2

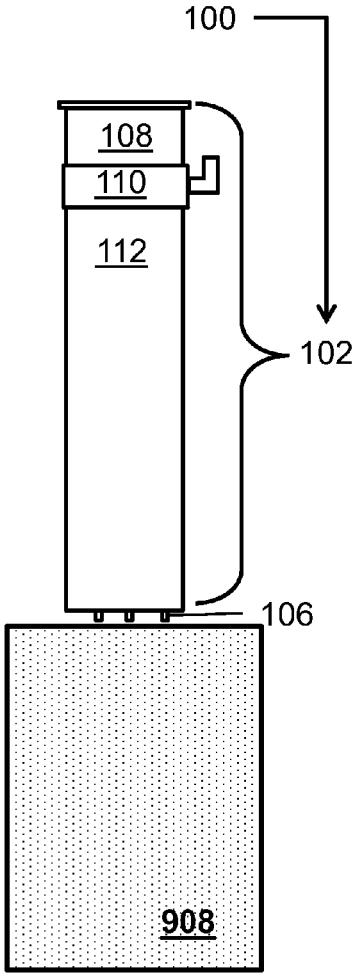

FIG. 3

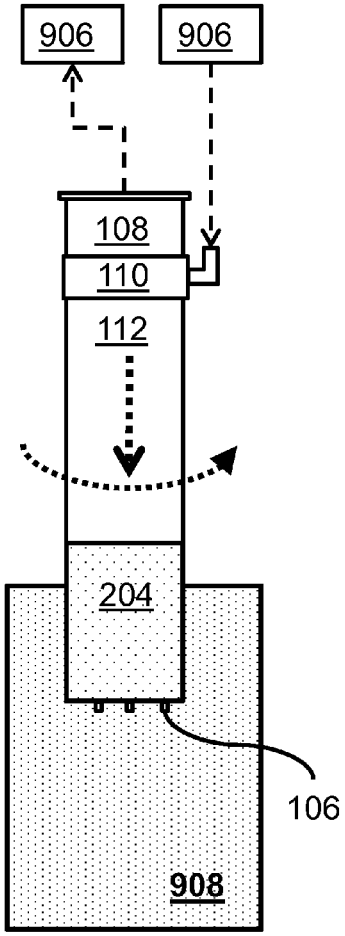

FIG. 4

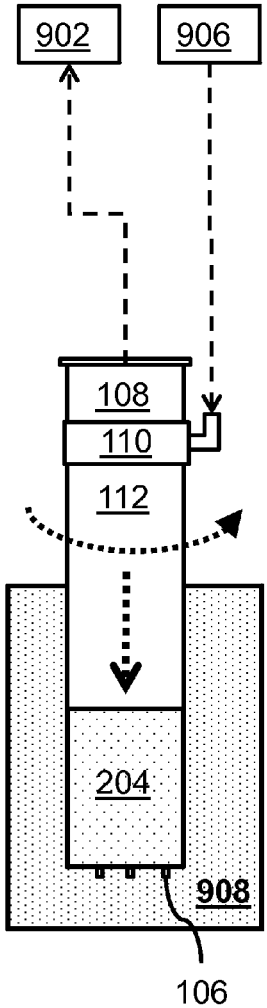

FIG. 5

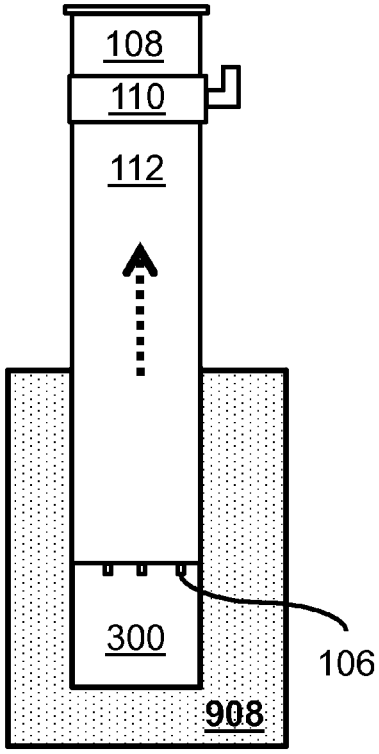

FIG. 6

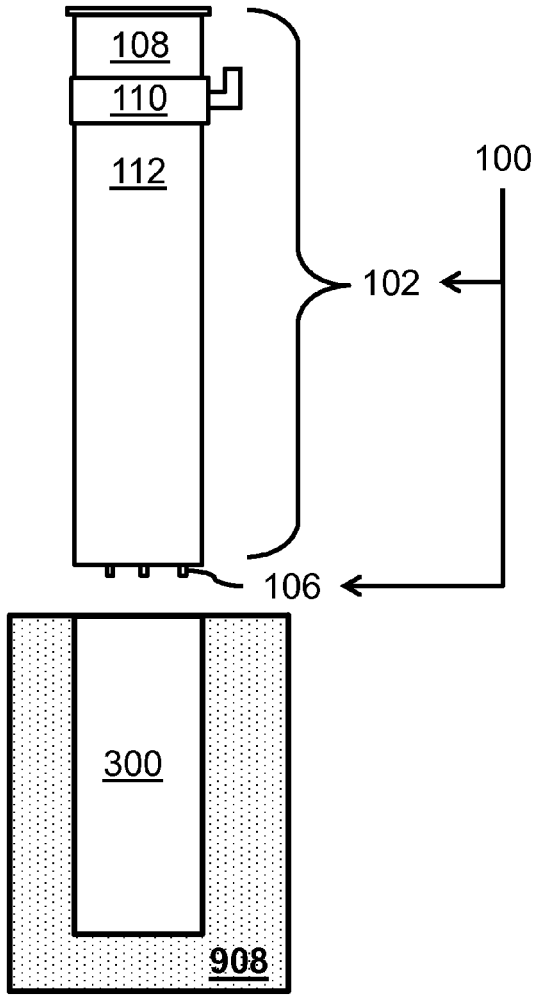

FIG. 7

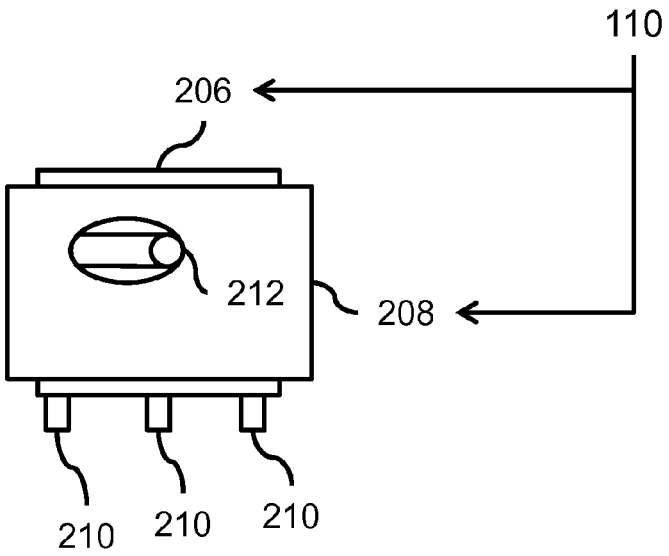

FIG. 8

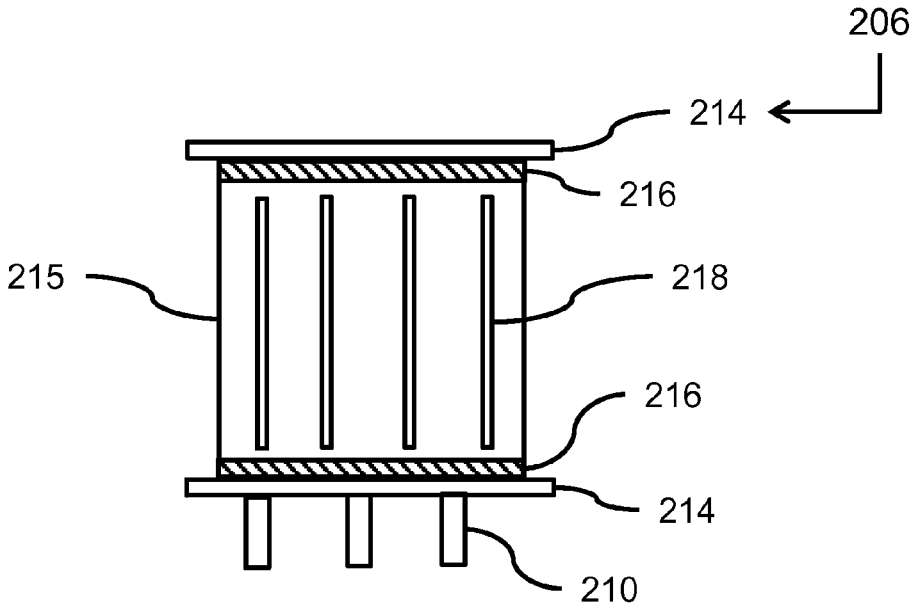

FIG. 9

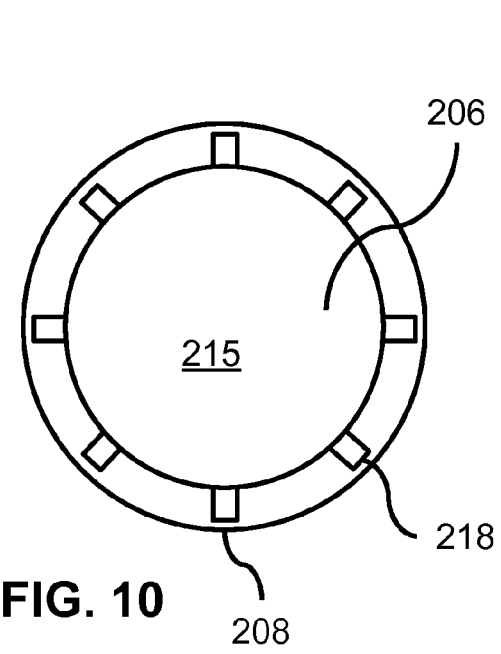

FIG. 10

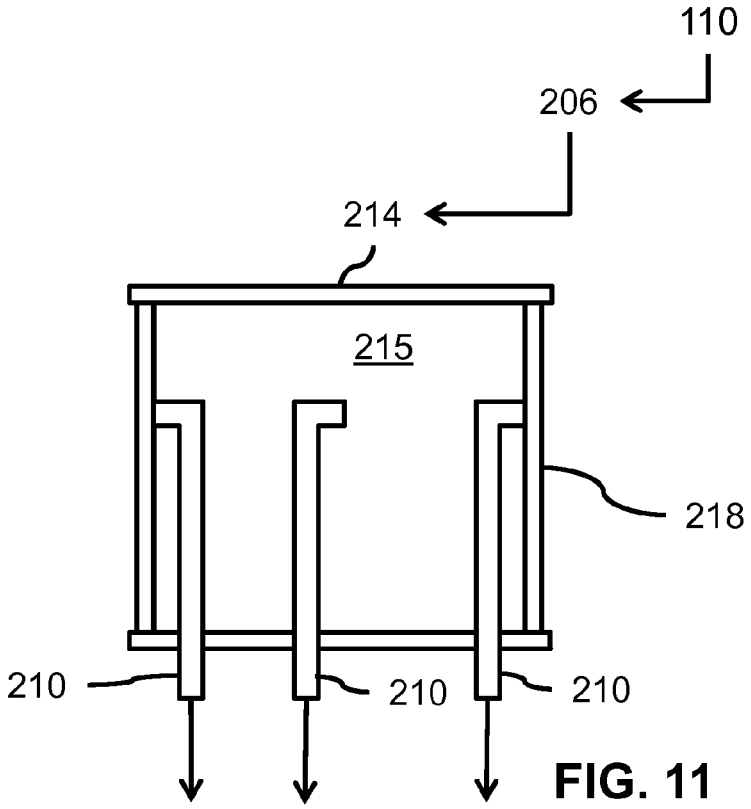

FIG. 11

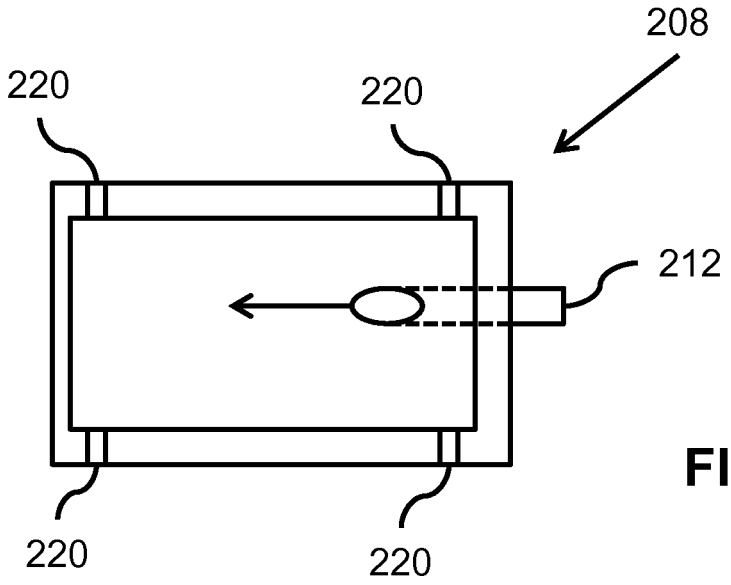

FIG. 12

APPARATUS FOR USE WITH HYDROVAC TRUCK

TECHNICAL FIELD

[0001] This document relates to the technical field of (and is not limited to) an apparatus for use with a hydrovac truck (and method therefor).

BACKGROUND

[0002] A hydrovac truck (also called a suction excavator or a vacuum excavator) is a construction vehicle configured to remove materials (soil) from a hole on land or remove heavy debris from land. The hydrovac truck is configured to produce powerful suction through a suction hose. The suction hose may have two handles for the operator to hold. The handles may be on a collar which can be rotated to uncover suction-release openings (with grilles over) to release the suction to make the suction nozzle drop anything which it has picked up and is too big to go up the tube. The end of the tube may be toothed. This helps to cut earth when used for excavating; however, when it is used to suck up loose debris and litter, some types of debris items may snag on the teeth. The earth to be sucked out may be loosened first with a compressed-air lance or a powerful water jet. Excavating with the hydrovac truck may be called vacuum excavation or hydro excavation if a water jet is used. Vacuum excavation (also known as suction excavation) is considered a best practice for safely finding and seeing underground utilities, reducing by more than half the chance of damaging buried utilities.

SUMMARY

[0003] It will be appreciated that there exists a need to mitigate (at least in part) at least one problem associated with the existing hydrovac trucks (also called the existing technology). After much study of the known systems and methods with experimentation, an understanding of the problem and its solution has been identified and is articulated as follows:

[0004] To mitigate, at least in part, at least one problem associated with the existing technology, there is provided (in accordance with a major aspect) an apparatus. The apparatus is for use with a hydrovac truck having a vacuum assembly for connection to a holding tank, with a water supply configured to provide pressurized flowing water. The apparatus includes an elongated hollow assembly that is movable along a longitudinal axis of the elongated hollow assembly. The elongated hollow assembly is configured to be fluidly connectable with the vacuum assembly. A water jet assembly is mounted to the elongated hollow assembly. The water jet assembly is configured to be fluidly connectable with the water supply. This is done in such a way that the water supply, in use, provides the pressurized flowing water to the water jet assembly, and the water jet assembly, in use, ejects the pressurized flowing water, which was received from the water supply, toward the soil. The pressurized flowing water, which was ejected from the water jet assembly toward the soil, cuts, in use, into the soil being positioned proximate to the water jet assembly, and urges, in use, the formation of a slurry having mixed water and soil positioned. The slurry is proximate to the water jet assembly with the slurry positioned, at least in part, within the elongated hollow assembly. In addition, the pressurized flowing water, which was ejected from the water jet assembly toward the soil, moves, in use, the water jet assembly along a circular path outlined by a cross-section of the elongated hollow assembly in the soil while the elongated hollow assembly and the water jet assembly move deeper into the soil. The vacuum assembly, in use, moves the slurry having mixed water and soil away from the water jet assembly along the elongated hollow assembly and toward the holding tank.

[0005] Other aspects are identified in the claims.

[0006] Other aspects and features of the non-limiting embodiments may now become apparent to those skilled in the art upon review of the following detailed description of the non-limiting embodiments with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The non-limiting embodiments may be more fully appreciated by reference to the following detailed description of the non-limiting embodiments when taken in conjunction with the accompanying drawings, in which:

[0008] FIG. **1** depicts a side view of an embodiment of an apparatus for use with a hydrovac truck;

[0009] FIG. **2** depicts a bottom end view of an embodiment of the apparatus of FIG. **1**;

[0010] FIG. **3**, FIG. **4**, FIG. **5**, FIG. **6** and FIG. **7** depict side views of embodiments of the apparatus of FIG. **1**;

[0011] FIG. **8** depicts a side view of an embodiment of the apparatus of FIG. **1**;

[0012] FIG. **9** depicts a side view of an embodiment of the apparatus of FIG. **1**;

[0013] FIG. **10** depicts a top view of an embodiment of the apparatus of FIG. **1**;

[0014] FIG. **11** depicts a side view of an embodiment of the apparatus of FIG. **1**; and

[0015] FIG. **12** depicts a side view of an embodiment of the apparatus of FIG. **1**.

[0016] The drawings are not necessarily to scale and may be illustrated by phantom lines, diagrammatic representations and fragmentary views. In certain instances, details unnecessary for an understanding of the embodiments (and/or details that render other details difficult to perceive) may have been omitted.

[0017] Corresponding reference characters indicate corresponding components throughout the several figures of the drawings. Elements in the several figures are illustrated for simplicity and clarity and have not been drawn to scale. The dimensions of some of the elements in the figures may be emphasized relative to other elements for facilitating an understanding of the various disclosed embodiments. In addition, common, but well-understood, elements that are useful or necessary in commercially feasible embodiments are often not depicted to provide a less obstructed view of the embodiments of the present disclosure.

LISTING OF REFERENCE NUMERALS USED IN THE DRAWINGS

[0018] **100** apparatus

[0019] **102** elongated hollow assembly

[0020] **104** longitudinal axis

[0021] **106** water jet assembly

[0022] **108** relatively stationary hollow tube assembly

[0023] **110** water connection assembly

[0024] **112** relatively rotatable hollow tube assembly

[0025] **114** first end section
[0026] **116** second end section
[0027] **118** water line assembly
[0028] **200** first end
[0029] **202** second end
[0030] **204** slurry
[0031] **206** inner rotatable shell
[0032] **208** outer stationary shell
[0033] **210** water outlet
[0034] **212** water inlet
[0035] **214** bearing plate
[0036] **215** rotatable body assembly
[0037] **216** seal bearing
[0038] **218** fin assembly
[0039] **220** water seal
[0040] **300** formed hole
[0041] **900** hydrovac truck
[0042] **902** vacuum assembly
[0043] **904** holding tank
[0044] **906** water supply
[0045] **908** soil
[0046] **910** pressurized flowing water

DETAILED DESCRIPTION OF THE NON-LIMITING EMBODIMENT(S)

[0047] The following detailed description is merely exemplary and is not intended to limit the described embodiments or the application and uses of the described embodiments. As used, the word "exemplary" or "illustrative" means "serving as an example, instance, or illustration." Any implementation described as "exemplary" or "illustrative" is not necessarily to be construed as preferred or advantageous over other implementations. All of the implementations described below are exemplary implementations provided to enable persons skilled in the art to make or use the embodiments of the disclosure and are not intended to limit the scope of the disclosure. The scope of the invention is defined by the claims. For the description, the terms "upper," "lower," "left," "rear," "right," "front," "vertical," "horizontal," and derivatives thereof shall relate to the examples as oriented in the drawings. There is no intention to be bound by any expressed or implied theory in the preceding Technical Field, Background, Summary or the following detailed description. It is also to be understood that the devices and processes illustrated in the attached drawings, and described in the following specification, are exemplary embodiments (examples), aspects and/or concepts defined in the appended claims. Hence, dimensions and other physical characteristics relating to the embodiments disclosed are not to be considered as limiting, unless the claims expressly state otherwise. It is understood that the phrase "at least one" is equivalent to "a". The aspects (examples, alterations, modifications, options, variations, embodiments and any equivalent thereof) are described regarding the drawings. It should be understood that the invention is limited to the subject matter provided by the claims, and that the invention is not limited to the particular aspects depicted and described.

[0048] FIG. **1** depicts a side view of an embodiment of an apparatus **100** for use with a hydrovac truck **900**.

[0049] More specifically, the apparatus **100** is for use with the hydrovac truck **900** having a vacuum assembly **902** for connection to a holding tank **904**, with a water supply **906** configured to provide pressurized flowing water.

[0050] The apparatus **100** includes a synergistic combination of an elongated hollow assembly **102** and a water jet assembly **106**.

[0051] The elongated hollow assembly **102** is movable along a longitudinal axis **104** of the elongated hollow assembly **102**. The elongated hollow assembly **102** is configured to be fluidly connectable (either directly or indirectly) with the vacuum assembly **902**. Specifically, the elongated hollow assembly **102** provides (includes) a first end **200** and a second end **202** that is positioned opposite from the first end **200**.

[0052] The water jet assembly **106** is mounted to the elongated hollow assembly **102**. Specifically, the water jet assembly **106** is mounted to the second end **202** of the elongated hollow assembly **102**. The water jet assembly **106** is configured to be fluidly connectable (either directly or indirectly) with the water supply **906**. This is done in such a way that the water supply **906**, in use, provides the pressurized flowing water to the water jet assembly **106** (as depicted in FIG. **1**). In addition, the water jet assembly **106**, in use, ejects the pressurized flowing water, which was received from the water supply **906**, toward the soil (as depicted in FIG. **4** and FIG. **5**). In addition, the pressurized flowing water, which was ejected from the water jet assembly **106** toward the soil, cuts, in use, into the soil being positioned proximate to the water jet assembly **106**, and urges, in use, the formation of a slurry **204** having mixed water and soil. The slurry **204** is positioned proximate to the water jet assembly **106** (as depicted in FIG. **4** and FIG. **5**), with the slurry **204** positioned, at least in part, within the elongated hollow assembly **102**. In addition, the pressurized flowing water, which was ejected from the water jet assembly **106** toward the soil, moves (rotates), in use, the water jet assembly **106** along a circular path (as depicted in FIG. **2**) that is outlined by a cross-section of the elongated hollow assembly **102** in the soil while the elongated hollow assembly **102** and the water jet assembly **106** move deeper into the soil (as depicted in FIG. **5**). In addition, the vacuum assembly **902**, in use, moves the slurry **204** having mixed water and soil away from the water jet assembly **106** along the elongated hollow assembly **102** and toward the holding tank **904** (as depicted in FIG. **4** and FIG. **6**).

[0053] In view of the foregoing, there is provided a method of operating the hydrovac truck **900**. The method includes (and is not limited to) a synergistic combination of operation (A), operation (B), operation (C), operation (D) and operation (E).

[0054] Operation (A) includes fluidly connecting (either directly or indirectly) the elongated hollow assembly **102** with the vacuum assembly **902**. The elongated hollow assembly **102** is movable along the longitudinal axis **104** of the elongated hollow assembly **102**.

[0055] Operation (B) includes fluidly connecting (either directly or indirectly) the water jet assembly **106** with the water supply **906**. The water jet assembly **106** is mounted to the elongated hollow assembly **102**.

[0056] Operation (C) includes providing the pressurized flowing water via the water supply **906** to the water jet assembly **106**.

[0057] Operation (D) includes ejecting, via the water jet assembly **106**, the pressurized flowing water, which was received from the water supply **906**, toward the soil. This is done in such way that the pressurized flowing water that is ejected from the water jet assembly **106** toward the soil: (a)

cuts into the soil being positioned proximate to the water jet assembly **106**, (b) urges formation of a slurry **204** having mixed water and soil positioned proximate to the water jet assembly **106** with the slurry **204** being positioned, at least in part, within the elongated hollow assembly **102**, and (c) moves (rotates) the water jet assembly **106** along a circular path that is outlined by a cross-section of the elongated hollow assembly **102** in the soil while the elongated hollow assembly **102** and the water jet assembly **106** move deeper into the soil.

[0058] Operation (E) includes moving the slurry **204** having mixed water and soil (via usage of the vacuum assembly **902**) away from the water jet assembly **106** along the elongated hollow assembly **102** and toward the holding tank **904**.

[0059] In summary, the apparatus **100** is configured, in use, to form a hole (also called, a pile hole) in the ground by making use of a pressurized flow of water (for formation of the hole in the ground) and making use of powered suction (for soil and water removal). Preferably, the hole that was formed by the apparatus **100** forms a straight pile hole. A technical effect of the apparatus **100** is a reduction of the risk of striking underground utilities (water pipes, power lines), etc. The apparatus **100** may be configured for use with any type of a hydrovac system (vehicle), etc.

[0060] Referring to the embodiment as depicted in FIG. **1**, the elongated hollow assembly **102** is adapted such that the elongated hollow assembly **102** includes a relatively stationary hollow tube assembly **108**. The relatively stationary hollow tube assembly **108** is configured to be fixedly attachable (that is, fluidly coupled) to the vacuum assembly **902** of the hydrovac truck **900**. This is done in such a way that the relatively stationary hollow tube assembly **108** is in fluid communication with the vacuum assembly **902** once the relatively stationary hollow tube assembly **108** is fixedly attached to the vacuum assembly **902**.

[0061] Referring to the embodiment as depicted in FIG. **1**, the water jet assembly **106** includes a water connection assembly **110**. The water connection assembly **110** is configured to be fluidly couplable (coupled, fixedly attachable, securely attached) to the relatively stationary hollow tube assembly **108**. In addition, the water connection assembly **110** is also configured to be fluidly coupled to the water supply **906**. This is done in such a way that the water connection assembly **110**, in use, receives the pressurized flowing water from the water supply **906**.

[0062] Referring to the embodiment as depicted in FIG. **1**, the elongated hollow assembly **102** further includes a relatively rotatable hollow tube assembly **112**. The relatively rotatable hollow tube assembly **112** includes a first end section **114**. The first end section **114** is configured to be fixedly attachable to the water connection assembly **110**. This is done in such a way that once the water connection assembly **110** is fixedly attached to the relatively stationary hollow tube assembly **108** and the water connection assembly **110** is fixedly attached to the relatively rotatable hollow tube assembly **112**, the relatively rotatable hollow tube assembly **112** is rotatably movable relative to the relatively stationary hollow tube assembly **108**, and the relatively rotatable hollow tube assembly **112** is in fluid communication with the relatively stationary hollow tube assembly **108**.

[0063] Referring to the embodiment as depicted in FIG. **1**, the relatively rotatable hollow tube assembly **112** further includes a second end section **116** . The second end section **116** is positioned opposite from the first end section **114**. The second end section **116** is configured to be positioned proximate to the soil (as depicted in FIG. **3**).

[0064] Referring to the embodiment as depicted in FIG. **4** and FIG. **5**, the water jet assembly **106** is positioned proximate to the second end section **116** at a perimeter of the second end section **116**. The water jet assembly **106** is fluidly connected to the water line assembly **118**.

[0065] Referring to the embodiment as depicted in FIG. **1**, the relatively rotatable hollow tube assembly **112** further includes a water line assembly **118**. The water line assembly **118** extends (at least in part) along a longitudinal length of the relatively rotatable hollow tube assembly **112**. The water line assembly **118** is configured to be fluidly connectable with the water connection assembly **110**. This done in such a way that the water line assembly **118** receives the pressurized flowing water from the water connection assembly **110** once the water line assembly **118** is fluidly connected with the water connection assembly **110**. More specifically, there is provided three instances of the water line assembly **118** and three instances of the water jet assembly **106** (that is, one instance of the water line assembly **118** for each instance of the water jet assembly **106**).

[0066] FIG. **2** depicts a bottom end view of an embodiment of the apparatus **100** of FIG. **1**.

[0067] Referring to the embodiment as depicted in FIG. **2**, three instances of the water jet assembly **106** are positioned at the outer rim of the relatively rotatable hollow tube assembly **112**. The water jet assembly **106** is configured to move along a circular path that is outlined by a cross-section of the elongated hollow assembly **102** in response to the ejection of the pressurized flowing water **910** from the water jet assembly **106**. Preferably, the water that is ejected from the water jet assembly **106** is directed (at least in part) along a radial direction (extending radially from the relatively rotatable hollow tube assembly **112**).

[0068] FIG. **3**, FIG. **4**, FIG. **5**, FIG. **6** and FIG. **7** depict side views of embodiments of the apparatus **100** of FIG. **1**.

[0069] Referring to the embodiment as depicted in FIG. **3**, the second end section **116** is configured to be positioned proximate to the soil **908**.

[0070] Referring to the embodiment as depicted in FIGS. **4** and **3**C, the water jet assembly **106** is configured to eject, in use, the pressurized flowing water toward the soil. This is done in such a way that the pressurized flowing water that is ejected from the water jet assembly **106**, in use, urges the relatively rotatable hollow tube assembly **112** to rotate while the relatively stationary hollow tube assembly **108** remains stationary. In addition, the pressurized flowing water that is ejected from the water jet assembly **106**, in use, loosens a portion of the soil positioned proximate to the perimeter of the second end section **116**. In addition, the pressurized flowing water that is ejected from the water jet assembly **106**, in use, mixes the soil that is loosened with the pressurized flowing water to form the slurry **204** having mixed water and soil.

[0071] Referring to the embodiment as depicted in FIG. **4** and FIG. **5**, once the vacuum assembly **902** of the hydrovac truck **900** is activated, the vacuum assembly **902** urges flow of the slurry **204** having the combination mixture of water and soil (also called, mixed water and soil) from the second end section **116** along the relatively rotatable hollow tube assembly **112** and along the relatively stationary hollow tube assembly **108** toward the vacuum assembly **902**.

[0072] Referring to the embodiments as depicted in FIG. **6** and FIG. **7**, the apparatus **100** is removed from a formed hole **300** that was formed by the apparatus **100**. It will be appreciated that the vacuum assembly **902** and the water supply **906** (as depicted in FIG. **1**) may continue to operate while the apparatus **100** is removed from the formed hole **300**.

[0073] FIG. **8** depicts a side view of an embodiment of the apparatus **100** of FIG. **1**.

[0074] Referring to the embodiment as depicted in FIG. **8**, the water connection assembly **110** includes an inner rotatable shell **206** and an outer stationary shell **208**. The outer stationary shell **208** surrounds, at least in part, the inner rotatable shell **206**. The inner rotatable shell **206** includes a water outlet **210**. The water outlet **210** is configured to be fluidly connectable (either directly or indirectly) with the water jet assembly **106** (as depicted in FIG. **1**). The outer stationary shell **208** includes a water inlet **212**. The water inlet **212** is configured to be fluidly connectable (either directly or indirectly) with the water supply **906** (depicted in FIG.**1**). For instance, there are three instances of the water outlet **210** (one for each instance of the water jet assembly **106**). The inner rotatable shell **206** includes a water outlet **210**. The water outlet **210** is configured to be fluidly connectable (either directly or indirectly) with the water jet assembly **106** (as depicted in FIG. **1**).

[0075] FIG. **9** depicts a side view of an embodiment of the apparatus **100** of FIG. **1**.

[0076] Referring to the embodiment as depicted in FIG. **9**, the inner rotatable shell **206** includes a rotatable body assembly **215** configured to rotate. The inner rotatable shell **206** includes a first bearing plate **214** abutting one side of the rotatable body assembly **215**. The first bearing plate **214** is configured to be relatively stationary. A second bearing plate **214** abuts another side of the rotatable body assembly **215**. The second bearing plate **214** is configured to be relatively stationary. The inner rotatable shell **206** further includes a seal bearing **216**. The seal bearing **216** has an inside section that is configured to rotate. The seal bearing **216** is fixedly attached to the outer stationary shell **208**. The seal bearing **216** is configured to friction fit to the inner rotatable shell **206**.

[0077] A fin assembly **218** extends radially from the rotatable body assembly **215**. The fin assembly **218** extends between the first bearing plate **214** and the second bearing plate **214**. The fin assembly **218** is configured to turn the rotatable body assembly **215** in response to the fin assembly **218** receiving a flow of water from a water inlet **212**.

[0078] FIG. **10** depicts a top view of an embodiment of the apparatus **100** of FIG. **1**.

[0079] Referring to the embodiment as depicted in FIG. **10**, instances of the fin assembly **218** are spaced apart along a circumference of the rotatable body assembly **215**.

[0080] FIG. **11** depicts a side view of an embodiment of the apparatus **100** of FIG. **1**.

[0081] Referring to the embodiment as depicted in FIG. **11**, a water outlet **210** is configured to receive water that rotates along the rotatable body assembly **215**.

[0082] FIG. **12** depicts a side view of an embodiment of the apparatus **100** of FIG. **1**.

[0083] Referring to the embodiment as depicted in FIG. **12**, the water connection assembly **110** includes a water seal **220**. The water seal **220** is positioned between the inner rotatable shell **206** and the outer stationary shell **208**.

[0084] This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to make and use the invention. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are within the scope of the claims if they have structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal language of the claims.

[0085] It may be appreciated that the assemblies and modules described above may be connected with each other as required to perform desired functions and tasks within the scope of persons of skill in the art to make such combinations and permutations without having to describe each and every one in explicit terms. There is no particular assembly or component that may be superior to any of the equivalents available to the person skilled in the art. There is no particular mode of practicing the disclosed subject matter that is superior to others, so long as the functions may be performed. It is believed that all the crucial aspects of the disclosed subject matter have been provided in this document. It is understood that the scope of the present invention is limited to the scope provided by the independent claim(s), and it is also understood that the scope of the present invention is not limited to: (i) the dependent claims, (ii) the detailed description of the non-limiting embodiments, (iii) the summary, (iv) the abstract, and/or (v) the description provided outside of this document (that is, outside of the instant application as filed, as prosecuted, and/or as granted). It is understood, for this document, that the phrase "includes" is equivalent to the word "comprising." The foregoing has outlined the non-limiting embodiments (examples). The description is made for particular non-limiting embodiments (examples). It is understood that the non-limiting embodiments are merely illustrative as examples.

What is claimed is:

1. An apparatus for use with a hydrovac truck having a vacuum assembly for connection to a holding tank, with a water supply configured to provide pressurized flowing water, the apparatus comprising:

an elongated hollow assembly being movable along a longitudinal axis of the elongated hollow assembly, and the elongated hollow assembly being configured to be fluidly connectable with the vacuum assembly; and

a water jet assembly being mounted to the elongated hollow assembly, and the water jet assembly being configured to be fluidly connectable with the water supply in such a way that:

the water supply, in use, provides the pressurized flowing water to the water jet assembly;

the water jet assembly, in use, ejects the pressurized flowing water, which was received from the water supply, toward the soil;

the pressurized flowing water, which was ejected from the water jet assembly toward the soil, cuts, in use, into the soil being positioned proximate to the water jet assembly, and urges, in use, formation of a slurry having mixed water and soil positioned proximate to the water jet assembly with the slurry positioned, at least in part, within the elongated hollow assembly;

the pressurized flowing water, which was ejected from the water jet assembly toward the soil, moves, in use, the water jet assembly along a circular path outlined

by a cross-section of the elongated hollow assembly in the soil while the elongated hollow assembly and the water jet assembly move deeper into the soil; and

the vacuum assembly, in use, moves the slurry having mixed water and soil away from the water jet assembly along the elongated hollow assembly and toward the holding tank.

2. The apparatus of claim **1**, wherein:

the elongated hollow assembly includes:

a relatively stationary hollow tube assembly being configured to be fluidly coupled to the vacuum assembly of the hydrovac truck in such a way that the relatively stationary hollow tube assembly is in fluid communication with the vacuum assembly once the relatively stationary hollow tube assembly is fixedly attached to the vacuum assembly.

3. The apparatus of claim **2**, wherein:

the water jet assembly includes:

a water connection assembly being configured to:

be fixedly attachable to the relatively stationary hollow tube assembly; and

be fluidly couplable to the water supply in such a way that the water connection assembly, in use, receives the pressurized flowing water from the water supply.

4. The apparatus of claim **3**, wherein:

the elongated hollow assembly further includes:

a relatively rotatable hollow tube assembly, including:

a first end section being configured to be fixedly attachable to the water connection assembly in such a way that once the water connection assembly is fixedly attached to the relatively stationary hollow tube assembly and fixedly attached to the relatively rotatable hollow tube assembly, the relatively rotatable hollow tube assembly is: (A) rotatably movable relative to the relatively stationary hollow tube assembly, and (B) in fluid communication with the relatively stationary hollow tube assembly.

5. The apparatus of claim **4**, wherein:

the relatively rotatable hollow tube assembly further includes:

a second end section being positioned opposite from the first end section, and the second end section being configured to be positioned on the soil.

6. The apparatus of claim **5**, wherein:

the relatively rotatable hollow tube assembly further includes:

a water line assembly extending, at least in part, along a longitudinal length of the relatively rotatable hollow tube assembly, and the water line assembly being configured to be fluidly connectable with the water connection assembly in such a way that the water line assembly receives the pressurized flowing water from the water connection assembly once the water line assembly is fluidly connected with the water connection assembly.

7. The apparatus of claim **6**, wherein:

the water jet assembly is positioned proximate to the second end section at a perimeter of the second end section, and the water jet assembly is fluidly connected to the water line assembly, and the water jet assembly being configured to eject, in use, the pressurized flowing water toward the soil in such a way that the pressurized flowing water that is ejected from the water jet assembly, in use, urges (A) the relatively rotatable hollow tube assembly to rotate while the relatively stationary hollow tube assembly remains stationary, and (B) loosens a portion of the soil positioned proximate to the perimeter of the second end section; and (C) mixes the soil that is loosened with the pressurized flowing water to form the slurry having mixed water and soil.

8. The apparatus of claim **7**, wherein:

once the vacuum assembly of the hydrovac truck is activated, the vacuum assembly urges flow of the slurry having mixed water and soil from the second end section along the relatively rotatable hollow tube assembly and along the relatively stationary hollow tube assembly toward the vacuum assembly.

9. The apparatus of claim **3**, wherein:

the water connection assembly includes:

an inner rotatable shell; and

an outer stationary shell surrounding, at least in part, the inner rotatable shell.

10. The apparatus of claim **9**, wherein:

the inner rotatable shell includes:

a water outlet being configured to be fluidly connectable with the water jet assembly.

11. The apparatus of claim **10**, wherein:

the outer stationary shell includes:

a water inlet being configured to be fluidly connectable with the water supply.

12. The apparatus of claim **9**, wherein:

the inner rotatable shell includes:

a water outlet being configured to be fluidly connectable with the water jet assembly; and

the outer stationary shell includes:

a water inlet being configured to be fluidly connectable with the water supply; and

the water inlet also being configured to be fluidly connectable with the water outlet.

13. The apparatus of claim **9**, wherein:

the inner rotatable shell includes:

a rotatable body assembly configured to rotate.

14. The apparatus of claim **13**, wherein:

the inner rotatable shell includes:

a first bearing plate abutting one side of the rotatable body assembly, and the first bearing plate being configured to be relatively stationary; and

a second bearing plate abutting another side of the rotatable body assembly, and the second bearing plate being configured to be relatively stationary.

15. The apparatus of claim **14**, wherein:

the inner rotatable shell further includes:

a seal bearing having an inside section being configures to rotate, and the seal bearing being fixedly attached to the outer stationary shell, and the seal bearing being configured to friction fit to the inner rotatable shell.

16. The apparatus of claim **14**, wherein:

a fin assembly extending radially from the rotatable body assembly, and the fin assembly extending between the first bearing plate and the second bearing plate, and the fin assembly being configured to turn the rotatable body assembly in response to the fin assembly receiving a flow of water from a water inlet.

17. The apparatus of claim **16**, wherein:

the fin assembly includes:

instances of the fin assembly being spaced apart along a circumference of the rotatable body assembly.

18. The apparatus of claim **13**, wherein:

a water outlet is configured to receive water that rotates along the rotatable body assembly.

19. The apparatus of claim **9**, wherein:

the water connection assembly includes:

a water seal being positioned between the inner rotatable shell and the outer stationary shell.

20. A method of operating a hydrovac truck having a vacuum assembly for connection to a holding tank, with a water supply configured to provide pressurized flowing water, the method comprising:

fluidly connecting an elongated hollow assembly with the vacuum assembly, and the elongated hollow assembly being movable along a longitudinal axis of the elongated hollow assembly; and

fluidly connecting a water jet assembly with the water supply, and the water jet assembly being mounted to the elongated hollow assembly;

providing the pressurized flowing water via the water supply to the water jet assembly;

ejecting, via the water jet assembly, the pressurized flowing water, which was received from the water supply, toward the soil in such way that the pressurized flowing water that is ejected from the water jet assembly toward the soil: (A) cuts into the soil being positioned proximate to the water jet assembly, (B) urges formation of a slurry having mixed water and soil positioned proximate to the water jet assembly with the slurry positioned, at least in part, within the elongated hollow assembly, and (C) moves the water jet assembly along a circular path outlined by a cross-section of the elongated hollow assembly in the soil while the elongated hollow assembly and the water jet assembly move deeper into the soil; and

moving the slurry having mixed water and soil, via usage of the vacuum assembly, away from the water jet assembly along the elongated hollow assembly and toward the holding tank.

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