



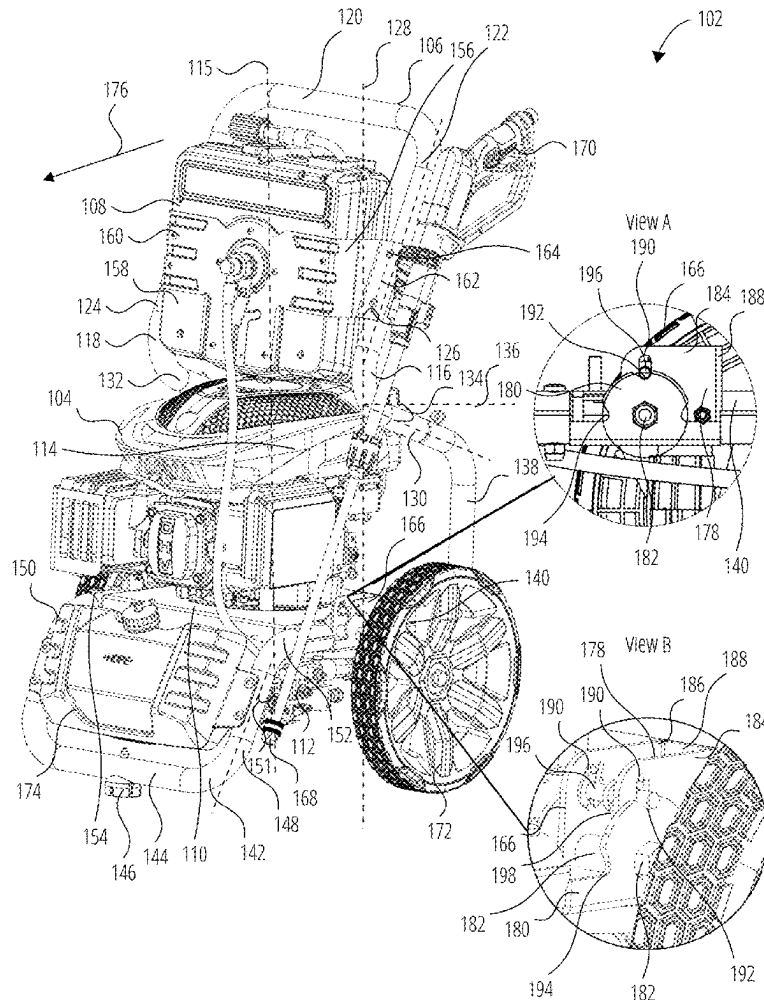
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(19) **United States**(12) **Patent Application Publication****Yuan et al.**(10) **Pub. No.: US 2025/0263268 A1**(43) **Pub. Date: Aug. 21, 2025**(54) **SELF-WINDING HOSE REELS FOR
PRESSURE WASHERS****B65H 75/48** (2006.01)**F16L 3/01** (2006.01)(71) Applicant: **Duro Industries, LLC**, Dover, DE
(US)(52) **U.S. Cl.**CPC **B65H 75/42** (2013.01); **B08B 3/026**(2013.01); **B65H 75/4478** (2013.01); **F16L****3/012** (2013.01); **B08B 2203/0276** (2013.01);**B65H 75/486** (2013.01)(72) Inventors: **Yue Yuan**, Dover, DE (US); **Haiquan
Wang**, Qingdao (CN)(21) Appl. No.: **19/202,260**(22) Filed: **May 8, 2025****Related U.S. Application Data**(63) Continuation-in-part of application No. 18/882,801,
filed on Sep. 12, 2024, now Pat. No. 12,330,182,
which is a continuation-in-part of application No.
18/367,680, filed on Sep. 13, 2023.**Publication Classification**(51) **Int. Cl.****B65H 75/42** (2006.01)**B08B 3/02** (2006.01)**B65H 75/44** (2006.01)

(57)

ABSTRACT

An assembly for high-pressure cleaning and a method for manufacturing an assembly for high-pressure cleaning are provided. The assembly includes a pressure washer, a handle, a self-winding hose reel, a first water hose, and a second water hose. The pressure washer includes a platform, an engine mounted onto the platform, and a water pump coupled to the engine. The handle is used for maneuvering the platform and is mounted onto the platform. The self-winding hose reel is coupled to the pressure washer. The first water hose has a first end and a second end. The first end of the first water hose is connected to the water pump. The second water hose is wound around the self-winding hose reel. The second water hose has a third end and a fourth end. The third end of the second water hose is connected to the second end of the first water hose.



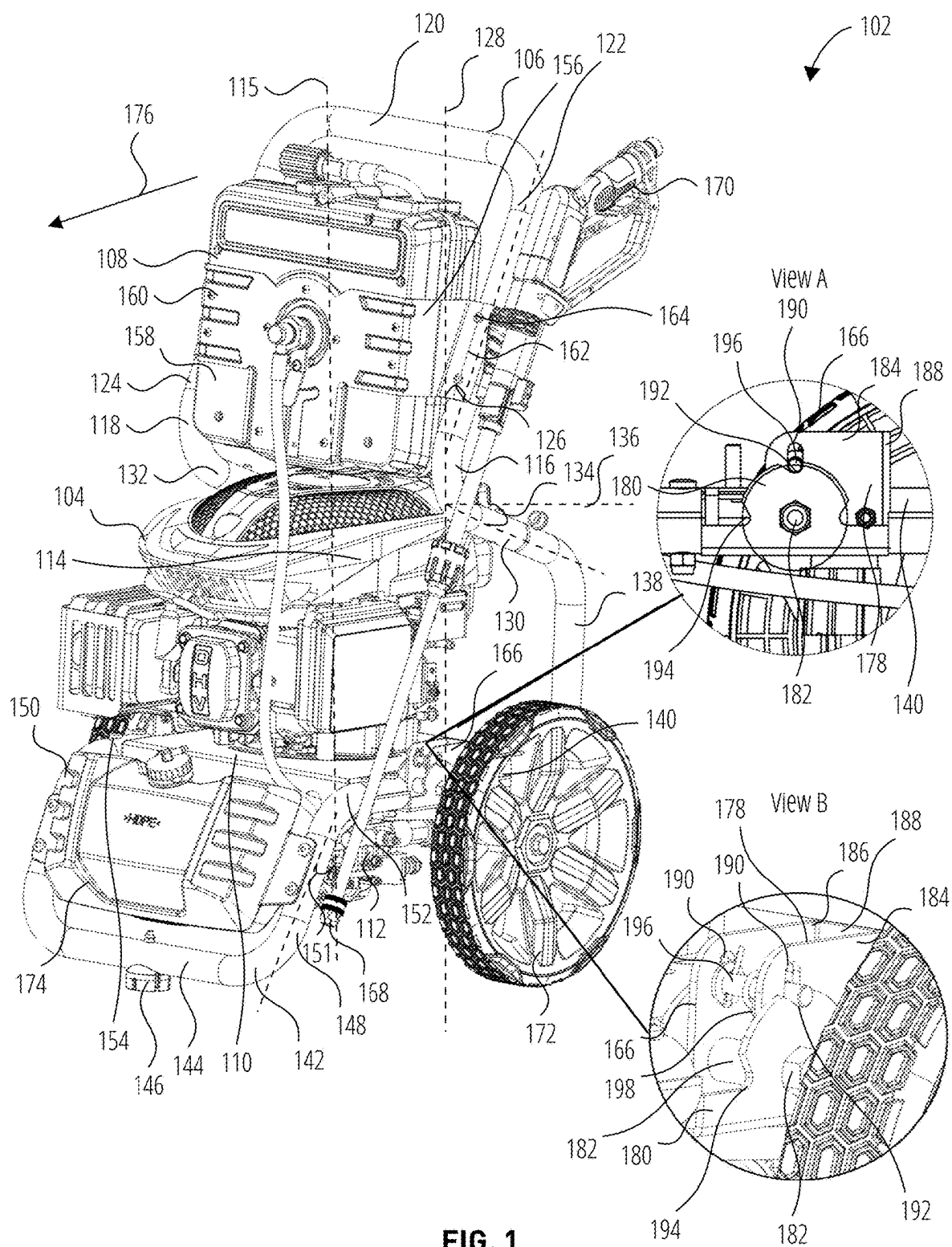


FIG. 1

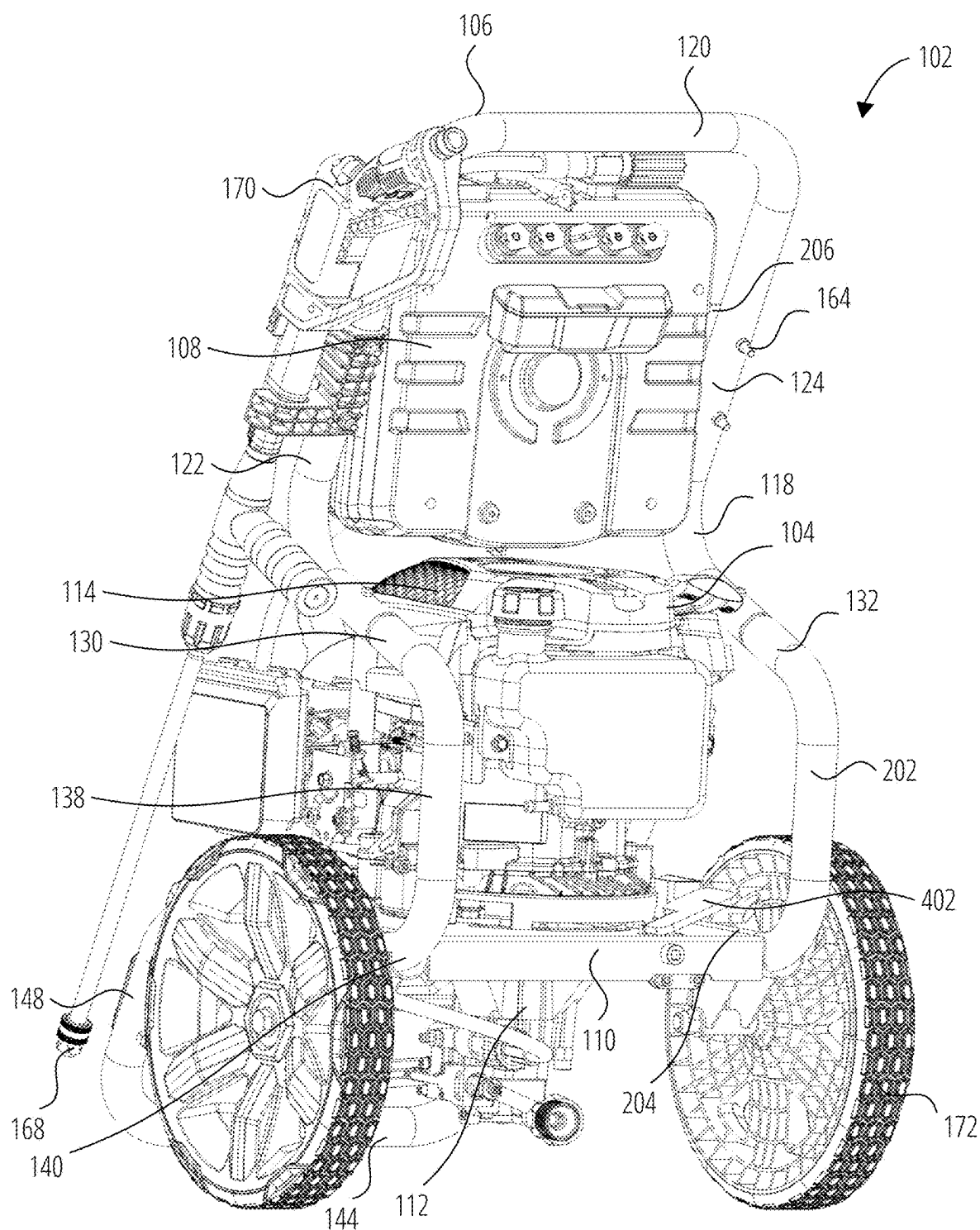


FIG. 2

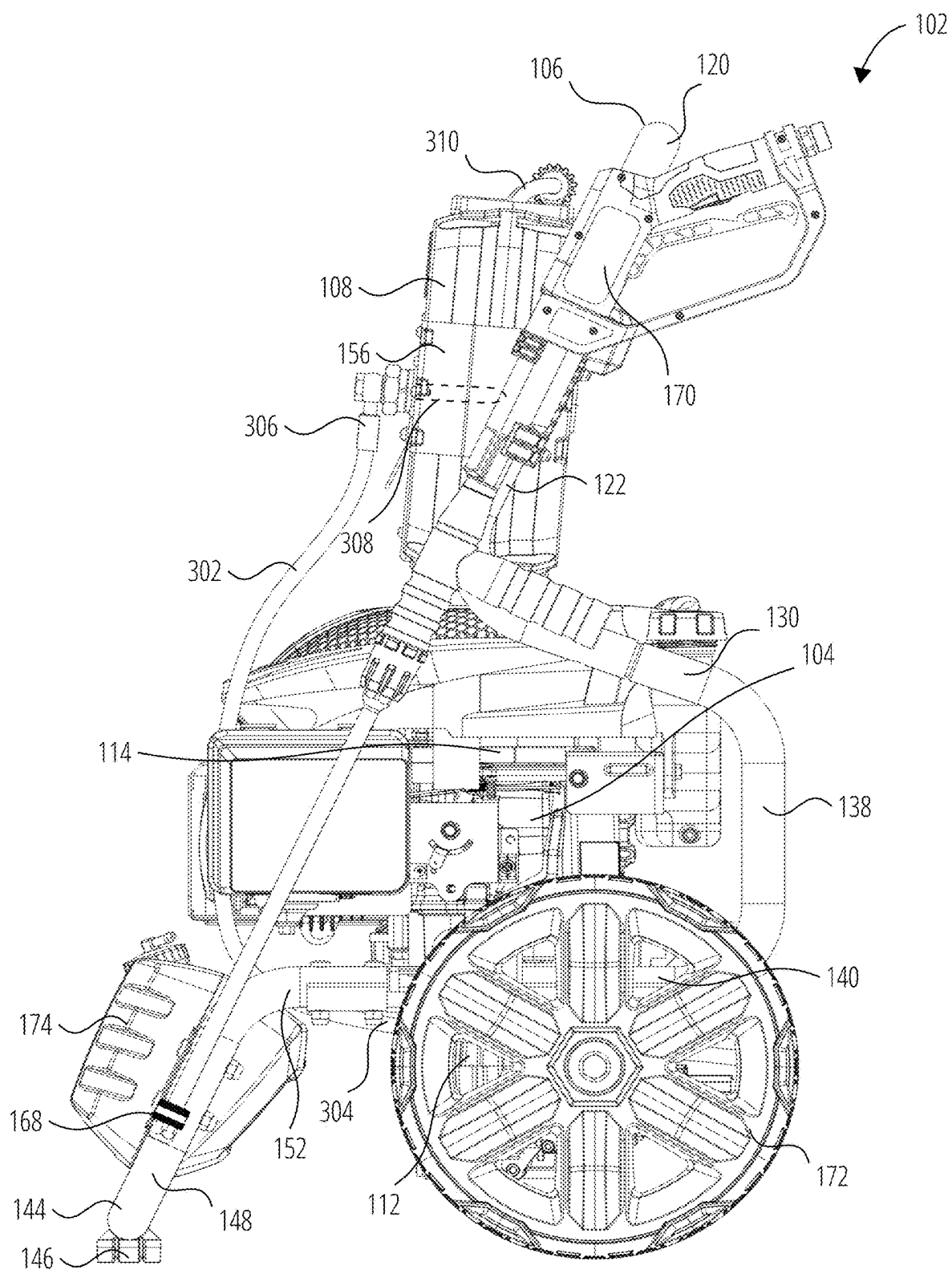


FIG. 3

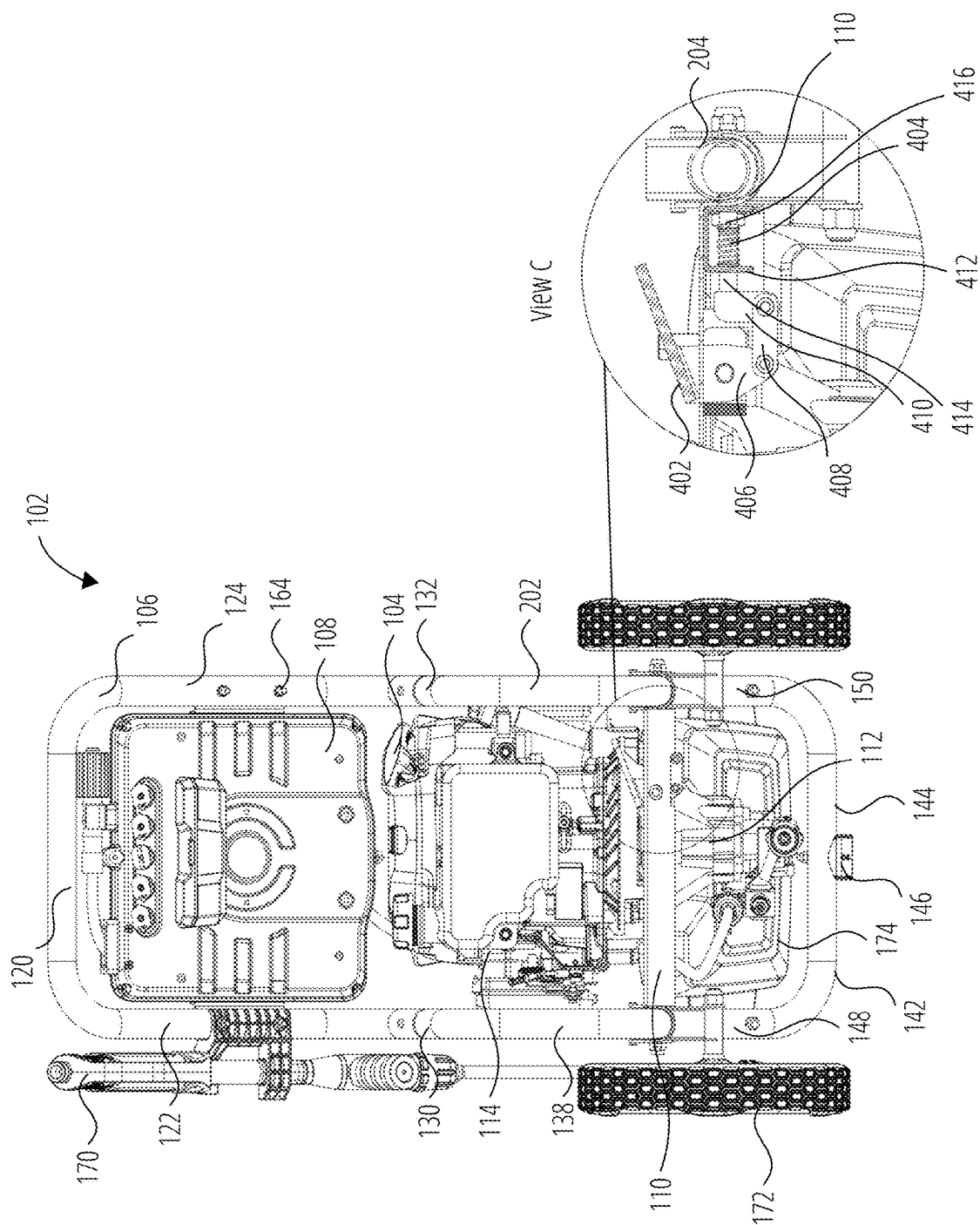


FIG. 4A

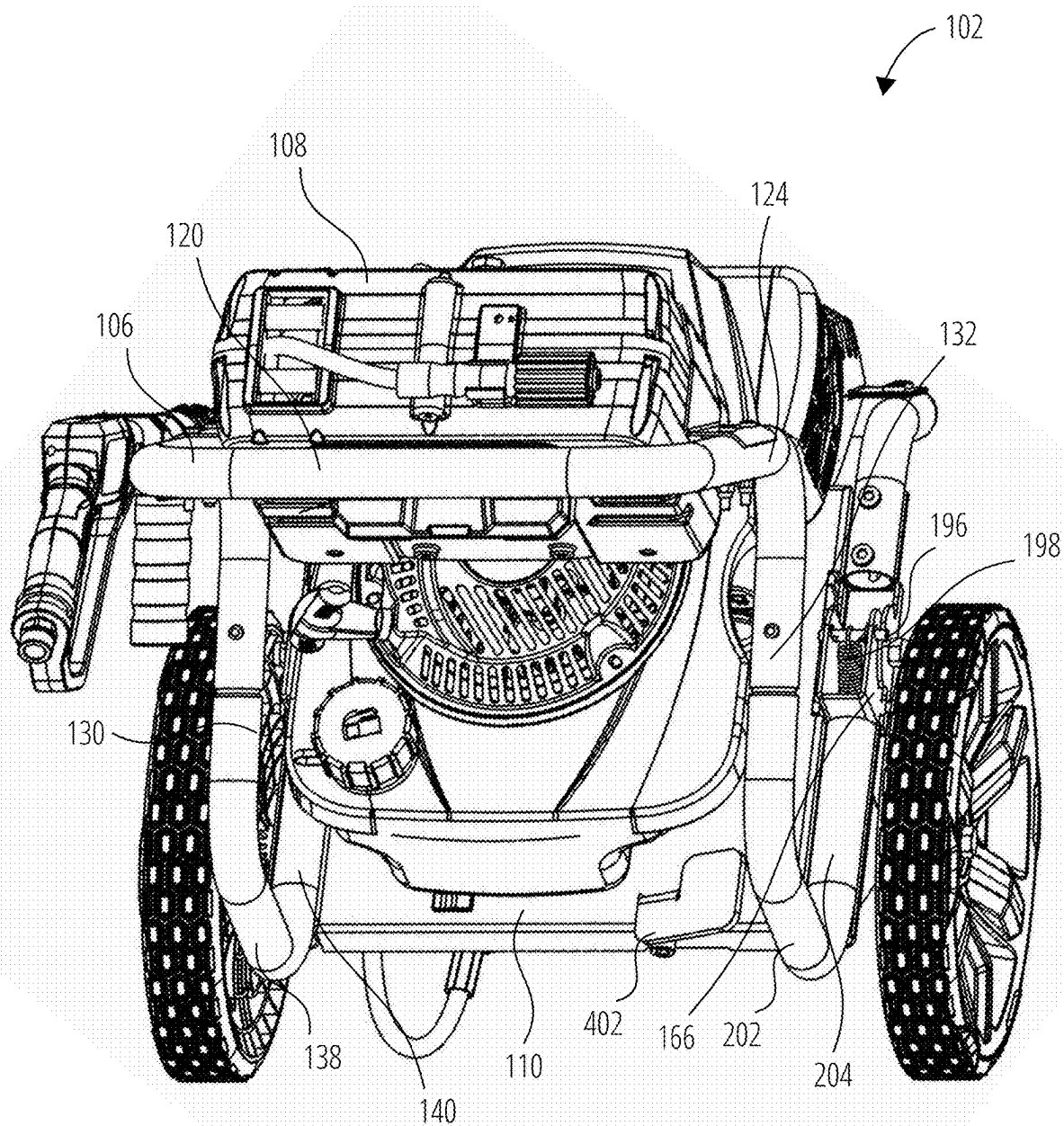
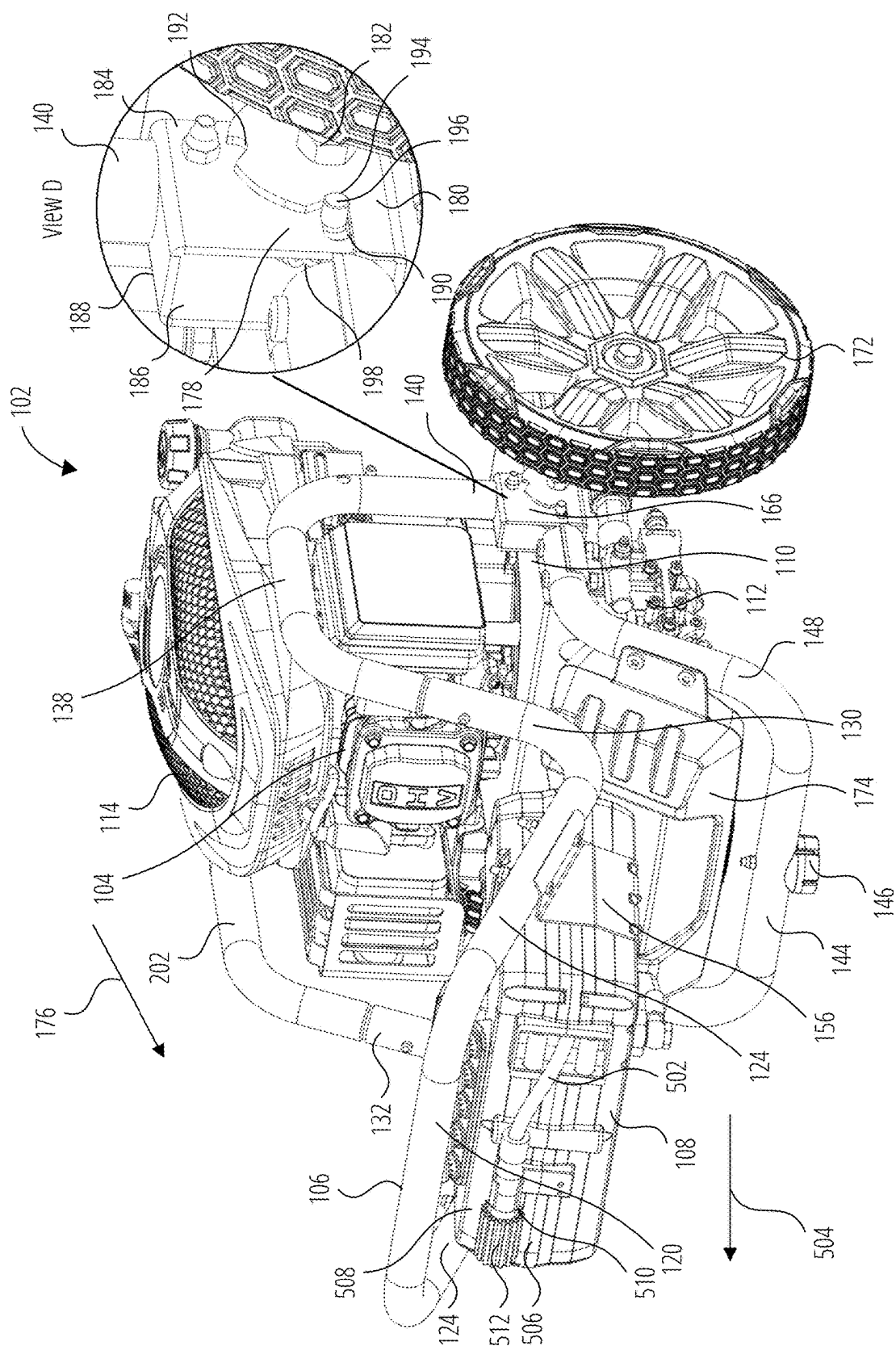


FIG. 4B



5
6
7

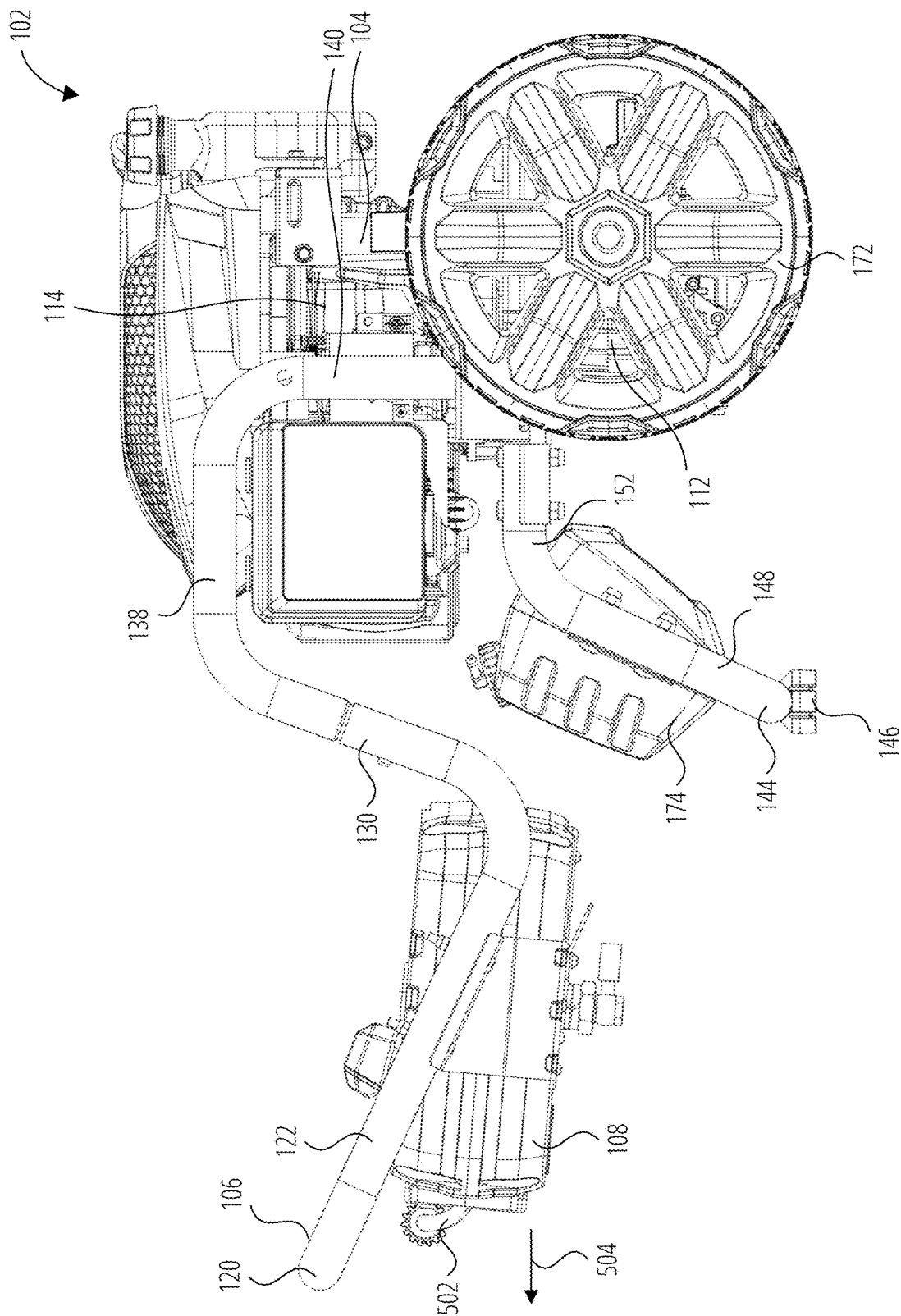


FIG. 6

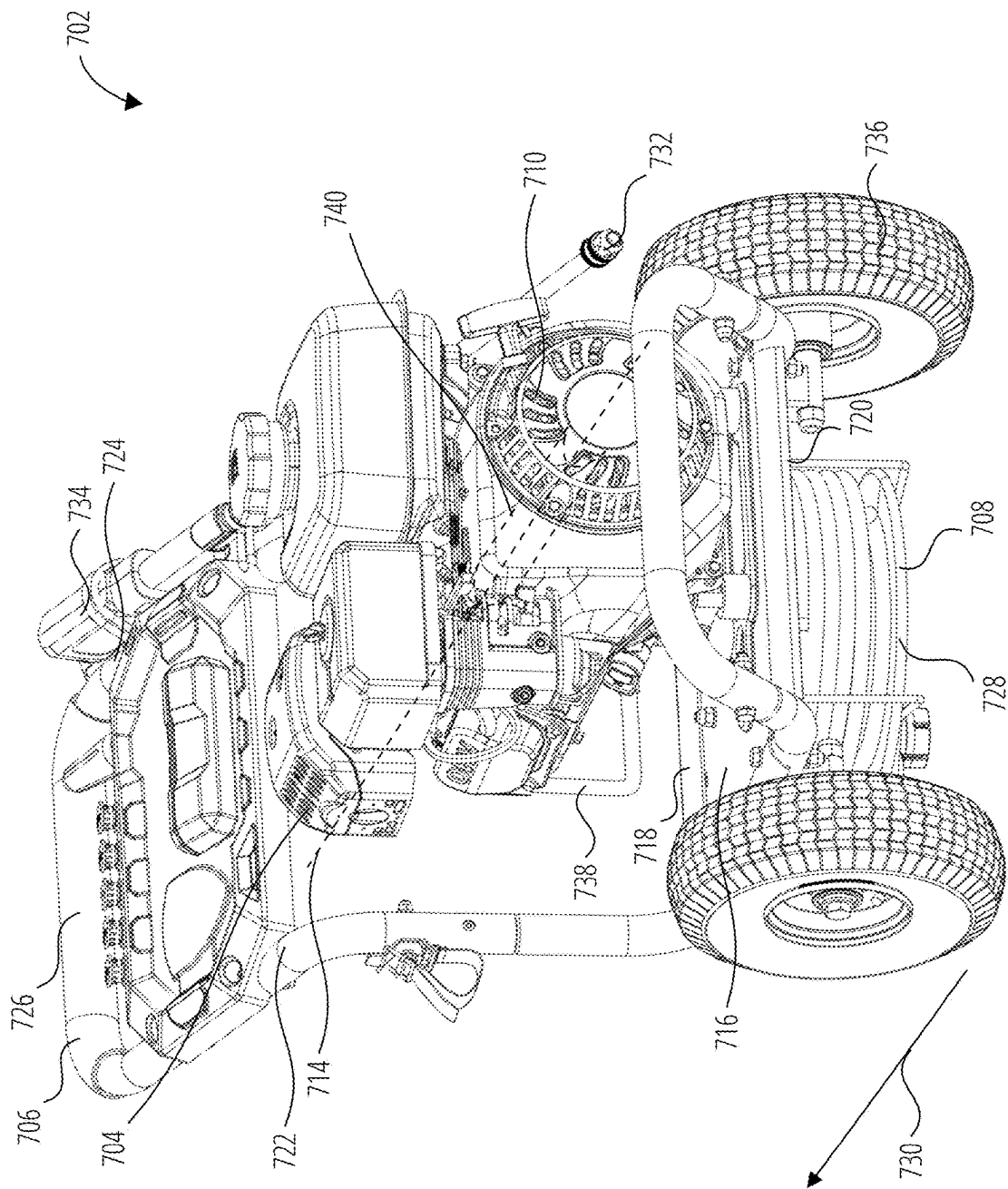


FIG. 7

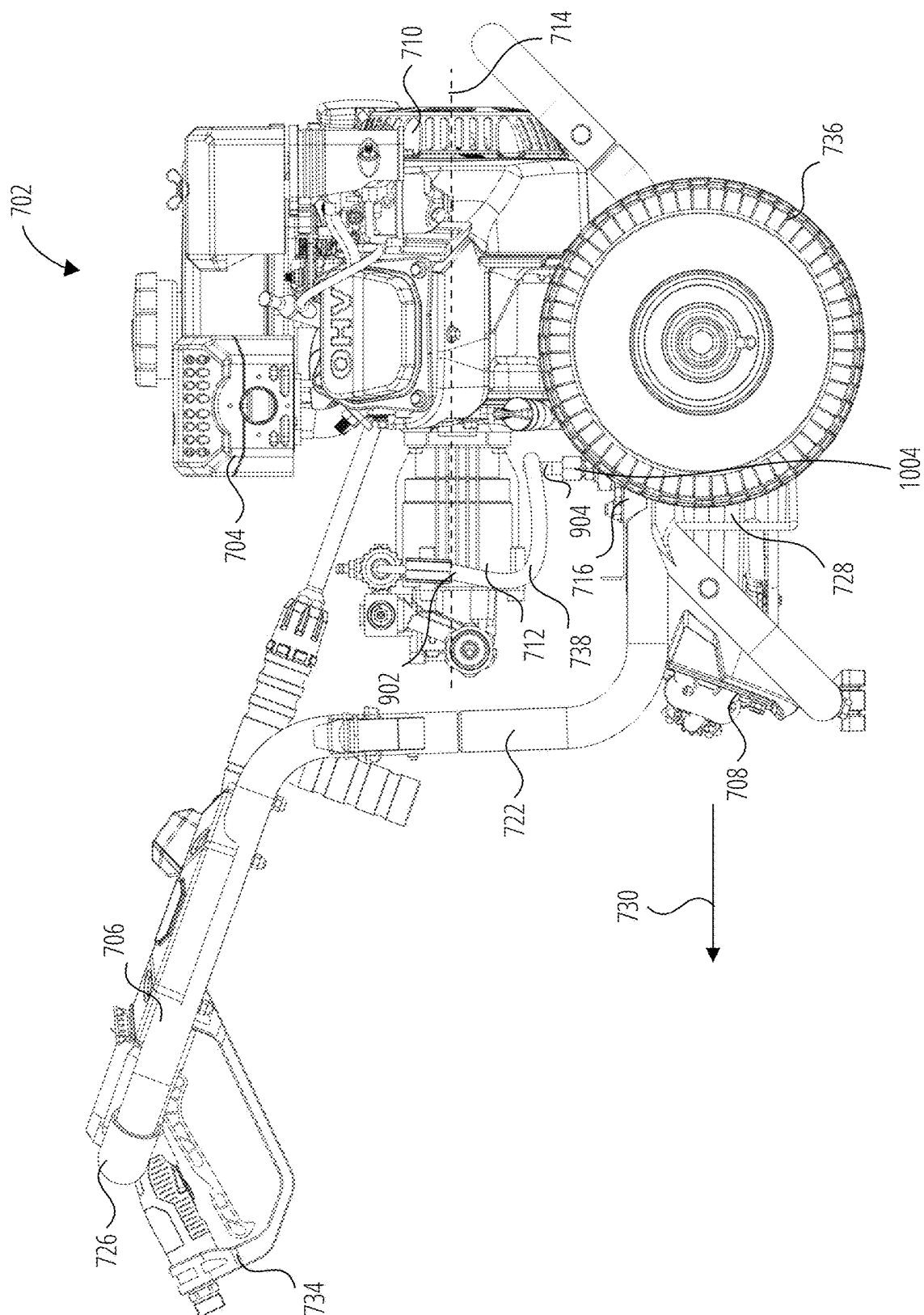


FIG. 9

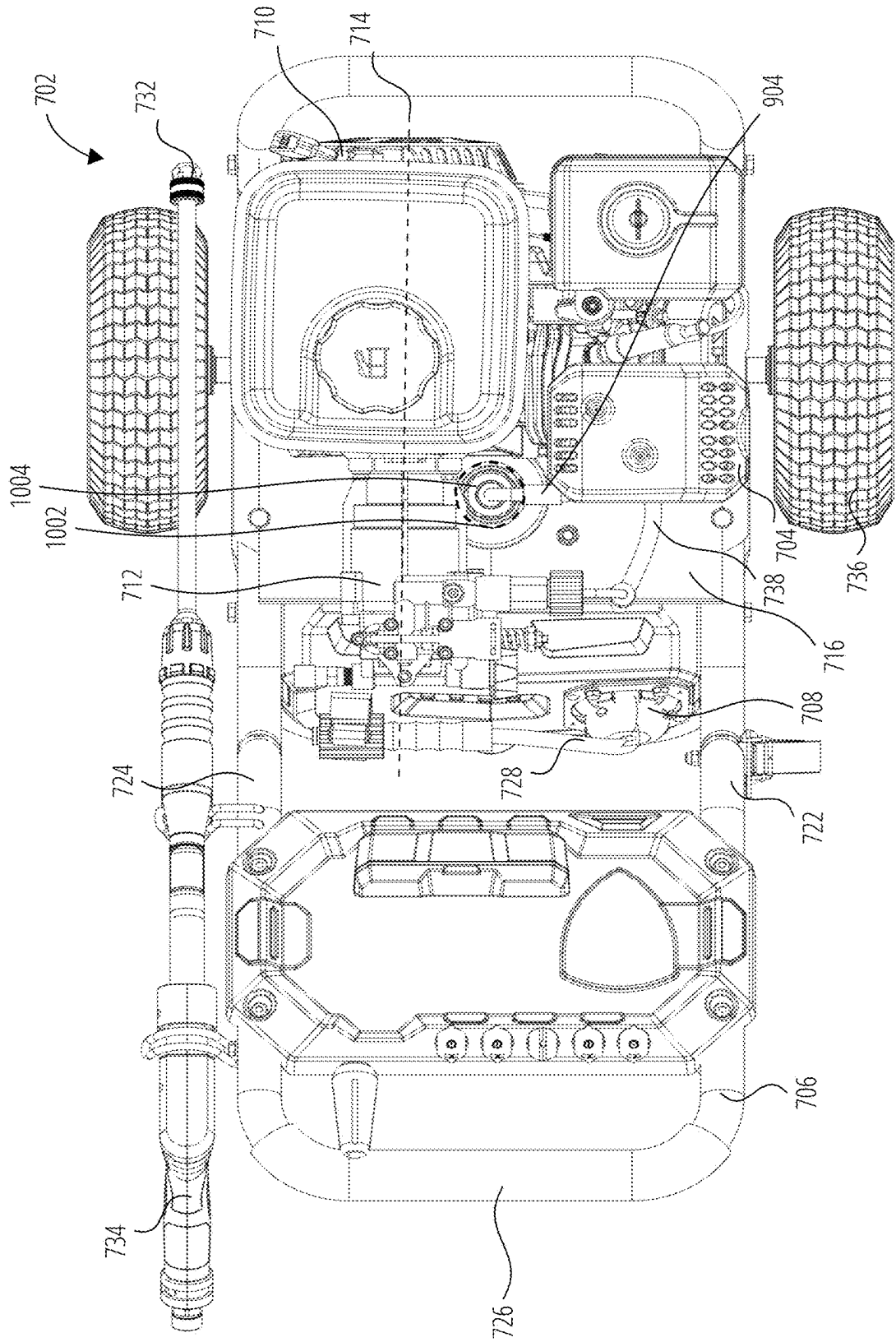


FIG. 10

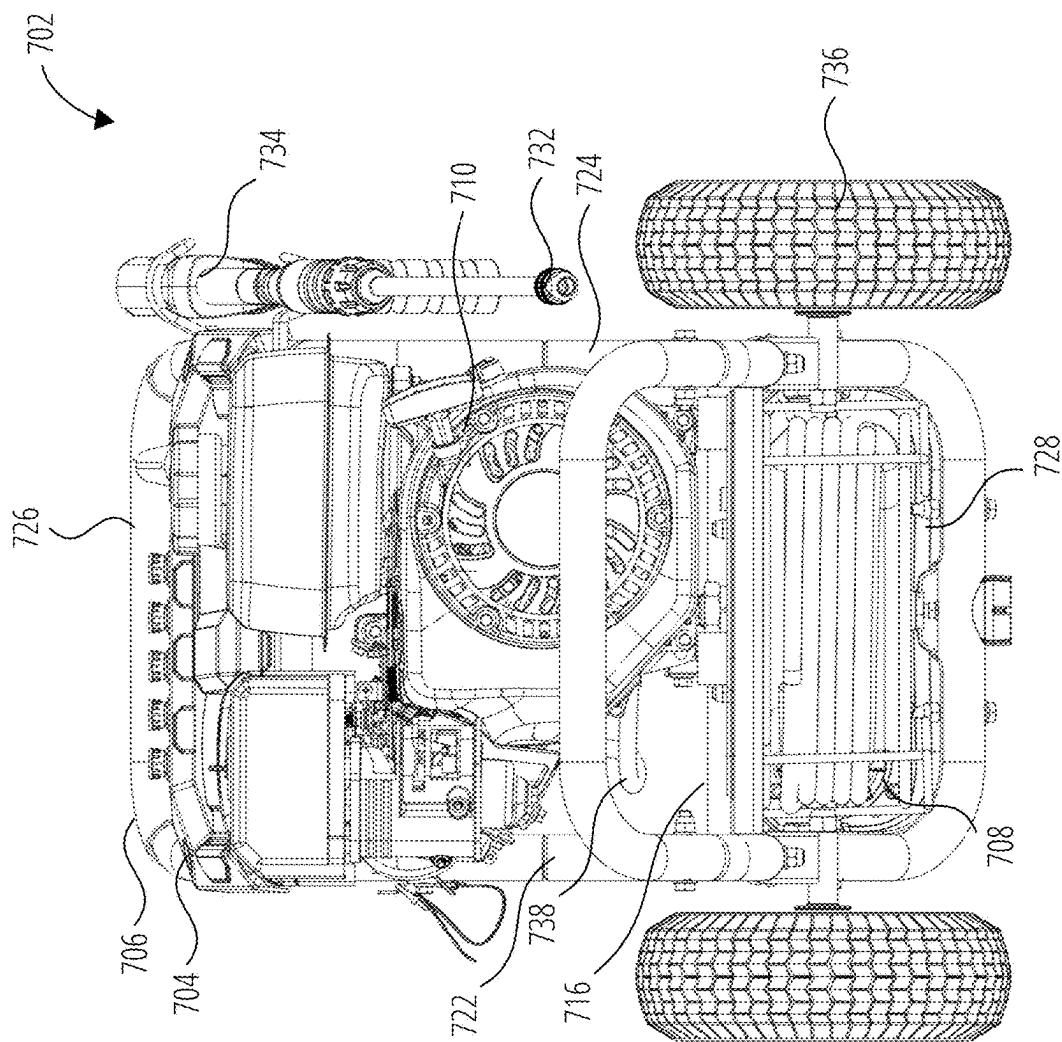


FIG. 11

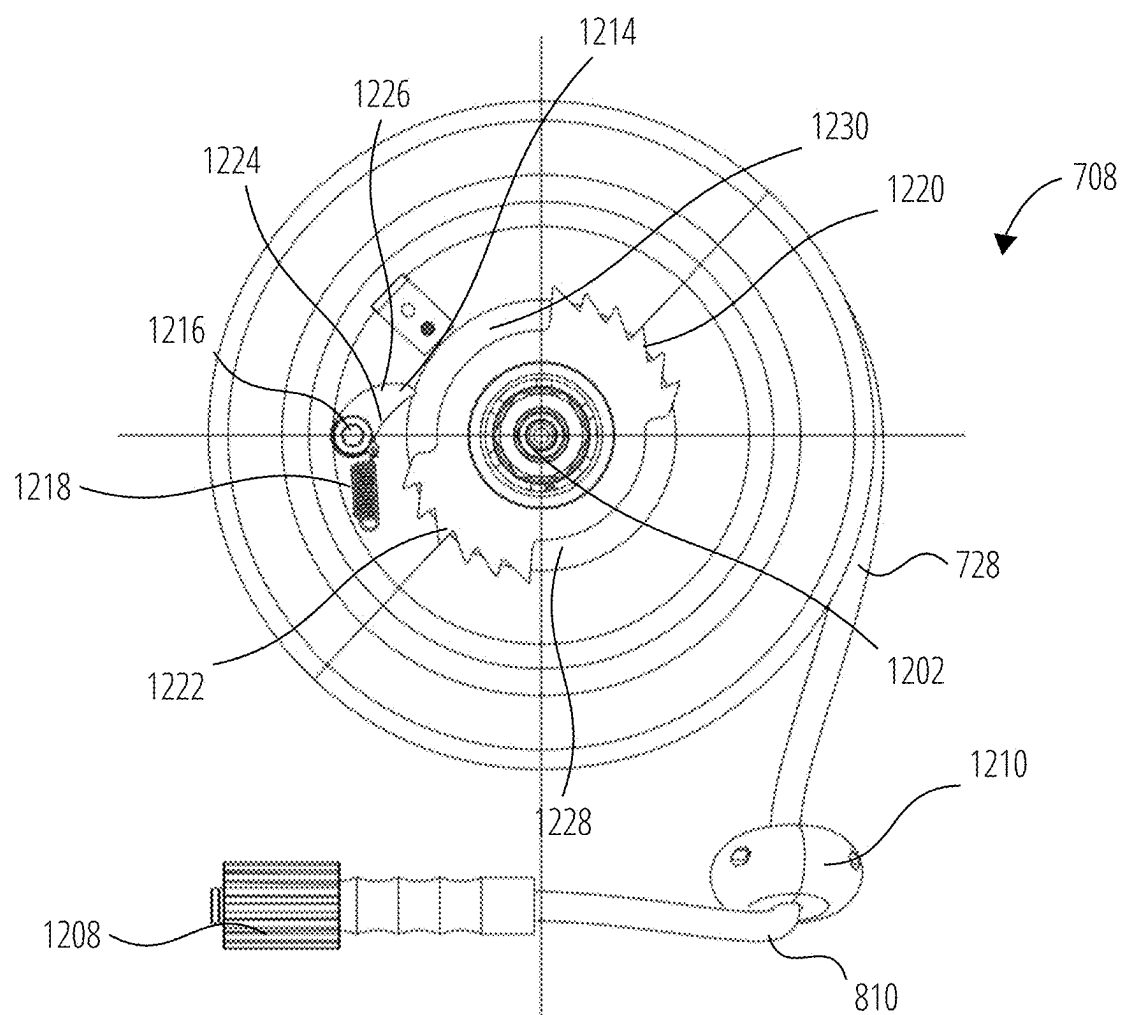


FIG. 12A

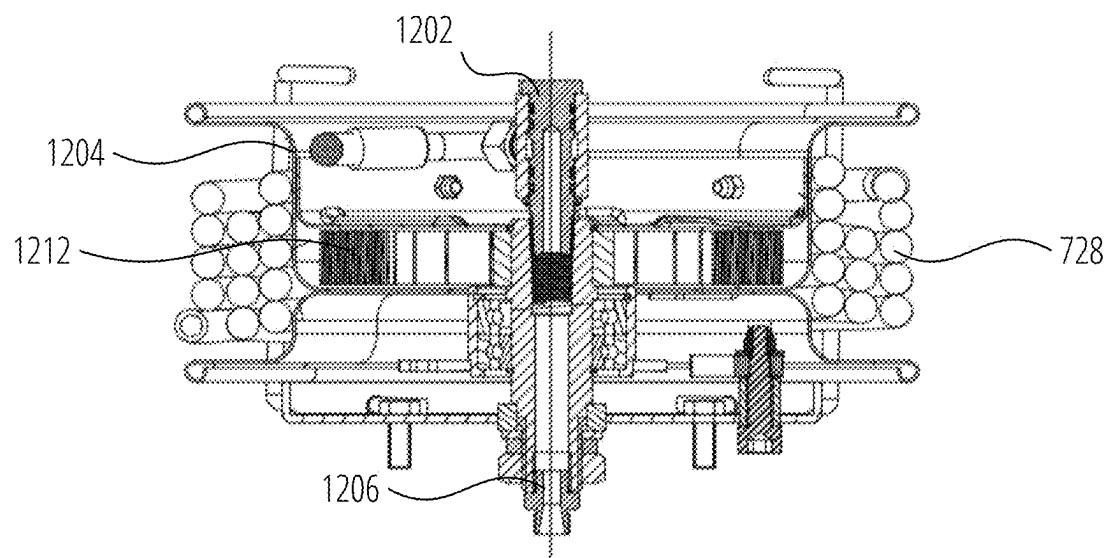


FIG. 12B

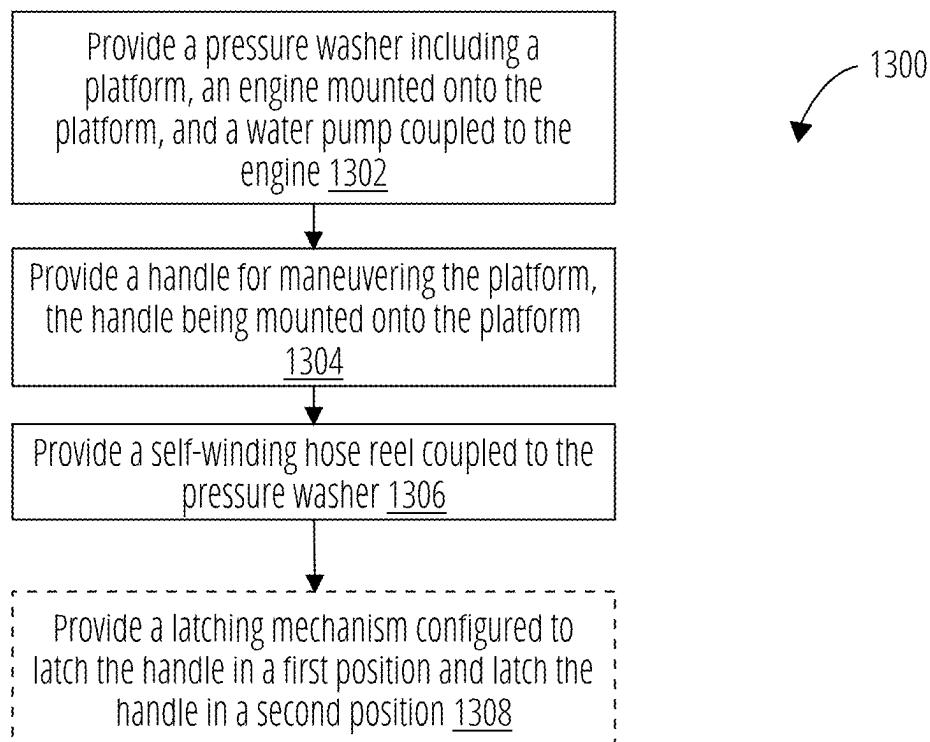


FIG. 13

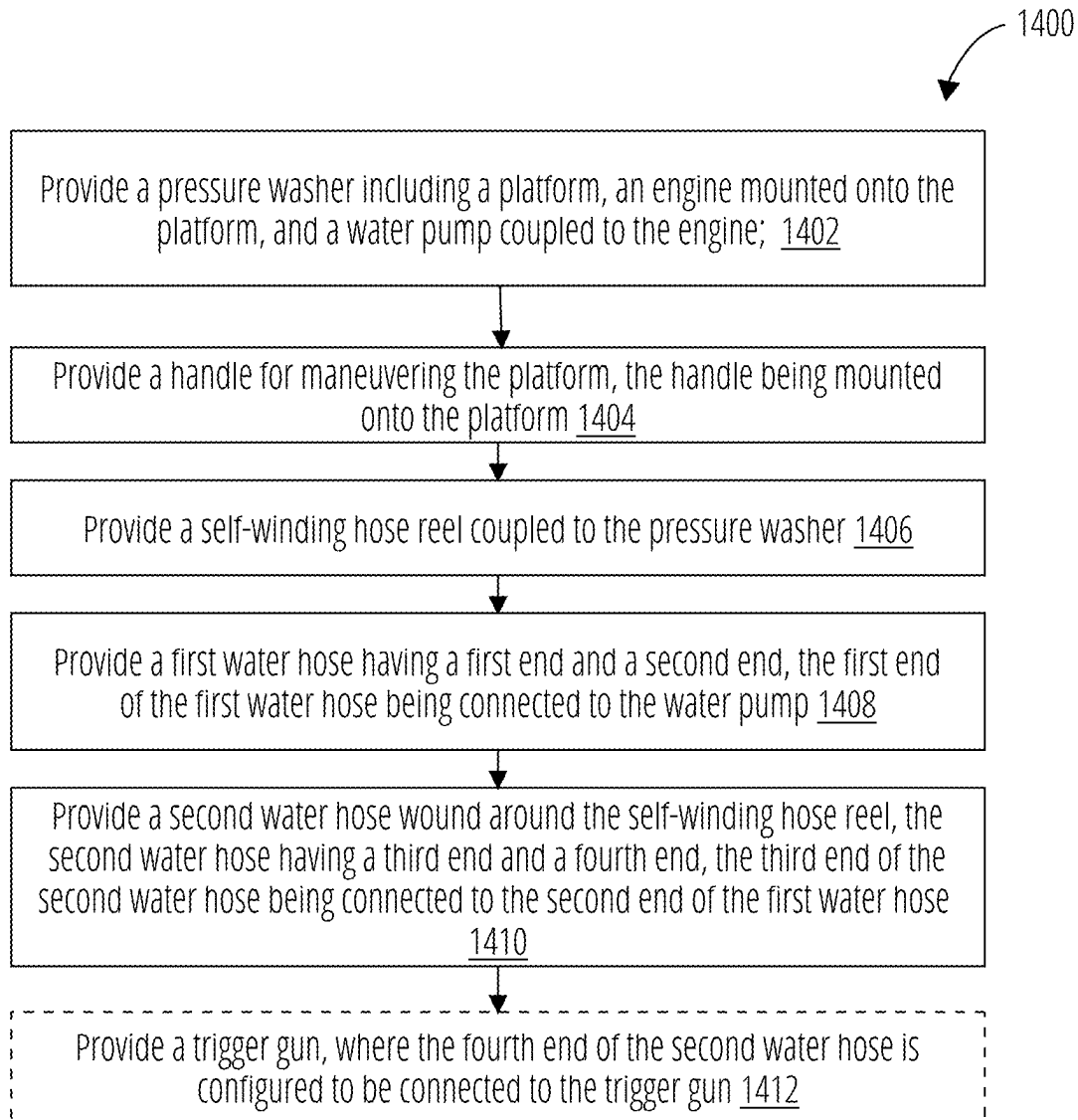


FIG. 14

SELF-WINDING HOSE REELS FOR PRESSURE WASHERS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a Continuation-in-Part of, and claims the priority benefit of, U.S. patent application Ser. No. 18/882,801, filed on Sep. 12, 2024, and entitled “SELF-WINDING HOSE REELS FOR PRESSURE WASHERS,” which in turn is a Continuation-in-Part of, and claims the priority benefit of, U.S. patent application Ser. No. 18/367,680, filed on Sep. 13, 2023, and entitled “SELF-WINDING HOSE REELS FOR PRESSURE WASHERS.” The subject matter of the aforementioned applications is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] This disclosure relates to pressure washers. More specifically, this disclosure relates to self-winding hose reels for pressure washers.

BACKGROUND

[0003] Pressure washers are machines that propel pressurized water to clean various surfaces, effectively removing dirt, grime, and contaminants. Components of a typical pressure washer include an engine as a power source for driving the pressure washer, a pump for pressurizing water, a frame for providing structural support and protection for the components, a spray nozzle for controlling the shape and intensity of the water stream, and a high-pressure water hose that connects the pump outlet to the spray nozzle. Additional components may be included depending on the specific model and type of pressure washer.

[0004] The high-pressure water hose is a conduit that delivers pressurized water from the pump to the spray nozzle. In conventional pressure washers, these hoses are often left loose, hanging on the side or in the middle of handles of the pressure washers. Users need to manually wrap and unwrap the high-pressure water hose, which can be challenging due to the high stiffness of the high-pressure water hose.

[0005] Some conventional pressure washers are equipped with a manual hose reel connected to a frame of the pressure washer for more convenient storage and management of the high-pressure water hose when not in use. However, operating these manual hose reels requires physical effort, as the user needs to manually crank a handle to wind or unwind the high-pressure water hose. This can be particularly tiresome if the high-pressure water hose is long and heavy.

[0006] Additionally, close attention should be given to mutual positioning of the components on the pressure washers. Specifically, the positioning of hose reels, especially when placed too high on the frame of the pressure washer and pulled too hard, can lead to stability issues. Elevated hose reels may cause tipping over of the pressure washer during operation or when unwinding the hose reels, posing a safety hazard and reducing the overall usability of the pressure washer.

SUMMARY

[0007] This summary is provided to introduce a selection of concepts in a simplified form that are further described in the Detailed Description below. This summary is not

intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

[0008] According to an example embodiment of the present disclosure, an assembly for high-pressure cleaning is provided. The assembly may include a pressure washer, a handle, a self-winding hose reel, a first water hose, and a second water hose. The pressure washer may include a platform, an engine mounted onto the platform, and a water pump coupled to the engine. The handle may be configured to be used for maneuvering the platform. The handle may be mounted onto the platform. The self-winding hose reel may be coupled to the pressure washer. The first water hose may have a first end and a second end. The first end of the first water hose may be connected to the water pump. The second water hose may be wound around the self-winding hose reel. The second water hose may have a third end and a fourth end. The third end of the second water hose may be connected to the second end of the first water hose.

[0009] According to another embodiment of the present disclosure, a method for manufacturing an assembly for high-pressure cleaning is provided. The method may commence with providing a pressure washer. The pressure washer may include a platform, an engine mounted onto the platform, and a water pump coupled to the engine. The method may further include providing a handle. The handle may be configured to be used for maneuvering the platform. The handle may be mounted onto the platform. The method may proceed with providing a self-winding hose reel. The self-winding hose reel may be coupled to the pressure washer. The method may further include providing a first water hose. The first water hose may have a first end and a second end. The first end of the first water hose may be connected to the water pump. The method may proceed with providing a second water hose. The second water hose may be wound around the self-winding hose reel. The second water hose may have a third end and a fourth end. The third end of the second water hose may be connected to the second end of the first water hose.

[0010] Other example embodiments of the disclosure and aspects will become apparent from the following description taken in conjunction with the following drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Exemplary embodiments are illustrated by way of example and not limitation in the figures of the accompanying drawings, in which like references indicate similar elements.

[0012] FIG. 1 is a front perspective view of an assembly for high-pressure cleaning with a handle in a first position and powered by a vertical shaft engine, according to an example embodiment.

[0013] FIG. 2 is a rear perspective view of the assembly for high-pressure cleaning, according to an example embodiment.

[0014] FIG. 3 is a right side view of the assembly for high-pressure cleaning, according to an example embodiment.

[0015] FIG. 4A is a rear view of the assembly for high-pressure cleaning showing in detail a pedal, according to an example embodiment.

[0016] FIG. 4B is a top perspective view of the assembly for high-pressure cleaning showing a pedal, according to an example embodiment.

[0017] FIG. 5 is a front perspective view of the assembly for high-pressure cleaning with the handle in a second position, according to an example embodiment.

[0018] FIG. 6 is a right side view of the assembly for high-pressure cleaning with the handle in the second position, according to an example embodiment.

[0019] FIG. 7 is a front perspective view of an assembly for high-pressure cleaning powered by a horizontal shaft engine, according to an example embodiment.

[0020] FIG. 8 is a rear perspective view of the assembly for high-pressure cleaning, according to an example embodiment.

[0021] FIG. 9 is a left side view of the assembly for high-pressure cleaning, according to an example embodiment.

[0022] FIG. 10 is an upper view of the assembly for high-pressure cleaning, according to an example embodiment.

[0023] FIG. 11 is a front view of the assembly for high-pressure cleaning, according to an example embodiment.

[0024] FIG. 12A is a top view of a self-winding hose reel, according to an example embodiment.

[0025] FIG. 12B is a front cross-sectional view of the self-winding hose reel, according to an example embodiment.

[0026] FIG. 13 illustrates a method for manufacturing an assembly for high-pressure cleaning, according to an example embodiment.

[0027] FIG. 14 illustrates a method for manufacturing an assembly for high-pressure cleaning, according to an example embodiment.

DETAILED DESCRIPTION

[0028] The following detailed description of embodiments includes references to the accompanying drawings, which form a part of the detailed description. Approaches described in this section are not prior art to the claims and are not admitted to be prior art by inclusion in this section. The drawings show illustrations in accordance with example embodiments. These example embodiments, which are also referred to herein as “examples,” are described in enough detail to enable those skilled in the art to practice the present subject matter. The embodiments can be combined, other embodiments can be utilized, or structural, logical, and operational changes can be made without departing from the scope of what is claimed. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope is defined by the appended claims and their equivalents.

[0029] Generally, the embodiments of this disclosure relate to assemblies for high-pressure cleaning. An assembly for high-pressure cleaning may include a pressure washer, a handle connected to the pressure washer, and a self-winding hose reel coupled to the pressure washer. The pressure washer may include a platform, an engine mounted onto the platform, and a water pump coupled to the engine. The handle may be mounted onto the platform and may be used for maneuvering the platform. In some example embodiments, the self-winding hose reel may be mounted on the handle. In some example embodiments, the self-winding hose reel may be mounted under the platform.

[0030] The self-winding hose reel may include a water hose, a drum onto which the water hose is wound, a spring disposed in the drum, and a housing for accommodating the

components of the self-winding hose reel. The spring may actuate the rotation of the drum and allow the water hose to be automatically wound up inside the housing of the self-winding hose reel after use.

[0031] The pressure washer may include any type of pressure washer available on the market. In example embodiments, the pressure washer may include a pressure washer powered by a vertical shaft engine. In some example embodiments, the pressure washer may include a pressure washer powered by a horizontal shaft engine. The present disclosure provides several example embodiments for attaching the self-winding hose reel to these types of pressure washers.

[0032] In the vertical shaft engine powered pressure washer, a pump (also referred herein to as a water pump) may be installed under a vertical shaft engine, i.e., at the bottom of the pressure washer. For this type of pressure washer, the self-winding hose reel may be configured to be rotated with respect to the vertical shaft engine. Specifically, the self-winding hose reel may be attached by a latching mechanism to a handle of the pressure washer. The handle may be a part of a frame of the pressure washer. The handle may be configured to rotate between a vertical position and a horizontal position. Since the self-winding hose reel is attached to the handle, rotating the handle causes the self-winding hose reel to rotate between the vertical position and the horizontal position. Specifically, the handle with the self-winding hose reel on it may be folded down into the horizontal position during the operation of the pressure washer and may be folded up into the vertical position when access to a fuel tank or other elements of the pressure washer is needed or when the pressure washer is not currently in use.

[0033] In the horizontal shaft engine powered pressure washer, the pump may be installed beside a horizontal shaft engine. The horizontal shaft engine powered pressure washer may have wheels (typically smaller than the ones in vertical shaft engine powered pressure washers) on the front side of the pressure washer and a horizontal type handle that extends horizontally. For this type of pressure washer, the self-winding hose reel may be arranged under the horizontal shaft engine, i.e., at the bottom of the pressure washer, and may be attached to a frame of the pressure washer.

[0034] Referring now to the drawings, various embodiments are described in which like reference numerals represent like parts and assemblies throughout the several views. It should be noted that the reference to various embodiments does not limit the scope of the claims attached hereto. Additionally, any examples outlined in this specification are not intended to be limiting and merely set forth some of the many possible embodiments for the appended claims.

[0035] FIGS. 1-6 illustrate an assembly for high-pressure cleaning in form of a pressure washer powered by an engine, according to an example embodiment. Specifically, FIGS. 1-6 illustrate the pressure washer powered by a vertical shaft engine. FIG. 1 is a front perspective view of an assembly for high-pressure cleaning shown as an assembly 102, according to an example embodiment. The assembly 102 is a vertical type handle assembly 102, i.e., the assembly 102 has a handle extending vertically. The assembly 102 may include a pressure washer 104, a handle 106 connected to the pressure washer 104, and a self-winding hose reel 108 mounted onto the handle 106. The pressure washer 104 may include a platform 110, vertical shaft engine 114, and a water

pump 112 coupled to the vertical shaft engine 114. The handle 106 may be mounted onto the platform 110. The handle 106 may be configured to be used for maneuvering the platform 110. The engine may include one of the following: an electric engine and a gasoline engine. The pressure washer 104 may include one of the following: an electrically powered high-pressure washer, a gasoline engine powered high-pressure washer, and any other type of pressure washer.

[0036] As shown in FIGS. 1-6, the assembly 102 may include the pressure washer 104 powered by the vertical shaft engine 114. Therefore, the assembly 102 is a vertical shaft engine powered pressure washer with the self-winding hose reel 108. The water pump 112 may be located under the vertical shaft engine 114. For example, the water pump 112 may be arranged on an axis 115 of a shaft of the vertical shaft engine 114. In an example embodiment, the vertical shaft engine 114 may be secured to an upper surface of the platform 110 using, for example, three bolts and nuts, and the same three bolts and nuts may be used to secure the water pump 112 to a bottom surface of the platform 110 and under the vertical shaft engine 114. The platform 110 may be located between the vertical shaft engine 114 and the water pump 112. In the example embodiment shown in FIG. 1, the self-winding hose reel 108 may be secured above the vertical shaft engine 114 when the assembly 102 is not in use.

[0037] The handle 106 may be configured to be rotated with respect to the vertical shaft engine 114 from a first position to a second position. FIGS. 1-3, 4A, and 4B show the handle 106 in the first position. While the handle 106 is in the first position, the self-winding hose reel 108 may be disposed vertically with respect to the vertical shaft engine 114. Moreover, while the handle 106 is in the first position, the self-winding hose reel 108 may be disposed above the vertical shaft engine 114.

[0038] The handle 106 may have a curvilinear form and include several parts. In an example embodiment, the handle 106 may include a first side pipe 116 and a second side pipe 118. In some example embodiments, the second side pipe 118 may be parallel to the first side pipe 116. The self-winding hose reel 108 may be secured between the first side pipe 116 and the second side pipe 118.

[0039] The handle 106 may include a holding part 120. The holding part 120 may be disposed horizontally. The holding part 120 may be used by a user of the assembly 102 for holding the handle 106 by hands when maneuvering the assembly 102 by the user. The holding part 120 may connect the first side pipe 116 and the second side pipe 118 to each other.

[0040] Each of the first side pipe 116 and the second side pipe 118 may include several parts connected to each other. Specifically, the handle 106 may further include a first pair of inclined parts, namely a first inclined part 122 and a second inclined part 124. The first inclined part 122 may connect, by its first end, to a first end of the holding part 120. The second inclined part 124 may connect, by its first end, to a second end of the holding part 120. When the handle 106 is in the first position, the first inclined part 122 and the second inclined part 124 may be disposed inclined for a first predetermined angle 126 from a vertical axis 128.

[0041] The handle 106 may further include a second pair of inclined parts, namely a third inclined part 130 and a fourth inclined part 132. The third inclined part 130 may

connect, by its first end, to the second end of the first inclined part 122. The fourth inclined part 132 may connect, by its first end, to the second end of the second inclined part 124. When the handle 106 is in the first position, the third inclined part 130 and the fourth inclined part 132 may be disposed inclined for a second predetermined angle 134 from a horizontal axis 136.

[0042] FIG. 2 is a rear perspective view of the assembly 102, according to an example embodiment. FIG. 3 is a right side view of the assembly 102, according to an example embodiment. FIG. 4A is a rear view of the assembly 102 showing in detail a pedal, according to an example embodiment. FIG. 4B is a top perspective view of the assembly for high-pressure cleaning showing a pedal, according to an example embodiment. As shown in FIGS. 1-3, 4A, and 4B, the handle 106 may further include a pair of support parts, namely a first support part 138 and a second support part 202 shown in FIG. 2. The first support part 138 may connect, by its first end, to the second end of the third inclined part 130. Similarly, the second support part 202 may connect, by its first end, to the second end of the fourth inclined part 132. When the handle 106 is in the first position, the first support part 138 and the second support part 202 may be disposed in a substantially vertical position.

[0043] The handle 106 may further include a pair of connecting parts, namely a first connecting part 140 and a second connecting part 204 shown in FIG. 2. The first connecting part 140 may connect, by its first end, to a second end of the first support part 138. Similarly, the second connecting part 204 may connect, by its first end, to a second end of the second support part 202. When the handle 106 is in the first position, the first connecting part 140 and the second connecting part 204 may be disposed in a substantially horizontal position.

[0044] Accordingly, the first side pipe 116 may include the first inclined part 122, the third inclined part 130, the first support part 138, and the first connecting part 140 connected to each other. Similarly, the second side pipe 118 may include the second inclined part 124, the fourth inclined part 132, the second support part 202, and the second connecting part 204 connected to each other.

[0045] The pressure washer 104 may further have a bottom support 142. The bottom support 142 may include a resting part 144. The resting part 144 may have a stop 146 located in the middle of the resting part 144. The stop 146 may contact a ground surface when the assembly 102 is not maneuvering.

[0046] The bottom support 142 may further include a pair of inclined parts, namely a fifth inclined part 148 and a sixth inclined part 150. The fifth inclined part 148 may connect, by its first end, to a first end of the resting part 144. Similarly, the sixth inclined part 150 may connect, by its first end, to a second end of the resting part 144. The fifth inclined part 148 and the sixth inclined part 150 may be disposed inclined for a third predetermined angle 151 from the vertical axis. In an example embodiment, the third predetermined angle 151 of inclination of the fifth inclined part 148 and the sixth inclined part 150 may be substantially equal to the first predetermined angle 126 of inclination of the first inclined part 122 and the second inclined part 124.

[0047] The bottom support 142 may further include a pair of connecting parts, namely a third connecting part 152 and a fourth connecting part 154. The third connecting part 152 may connect, by its first end, to the second end of the fifth

inclined part 148. Similarly, the fourth connecting part 154 may connect, by its first end, to a second end of the sixth inclined part 150. The third connecting part 152 and the fourth connecting part 154 may be disposed substantially horizontally.

[0048] The handle 106 and the bottom support 142 may form a frame of the pressure washer 104. The frame may provide structural support and protection for the components of the pressure washer 104. The handle 106 may be rotatable, and the bottom support 142 may remain in the same position both when the handle 106 is in the first position and when the handle 106 is in the second position.

[0049] The self-winding hose reel 108 may be secured to the handle 106 via a fastening plate 156. The fastening plate 156 may be a plate having a curvilinear form. The fastening plate 156 may be connected to a first surface 158 of the self-winding hose reel 108 via fastening elements 160, such as screws. The fastening plate 156 may also be connected by its first end 162 to the first inclined part 122 of the handle 106. The fastening plate 156 may further be connected by its second end 206 (shown in FIG. 2) to the second inclined part 124 of the handle 106. The fastening plate 156 may be connected to the handle 106 via fastening elements 164, such as screws. Accordingly, the fastening plate 156 may secure the self-winding hose reel 108 between the first side pipe 116 and the second side pipe 118 of the handle 106.

[0050] The assembly 102 may further include a latching mechanism 166 configured to latch the handle 106 to the platform 110 in the first position and latch the handle 106 to the platform 110 in the second position. The latching mechanism 166 may enable rotating the handle 106 between the first position and the second position. The latching mechanism 166 may be connected to the platform 110.

[0051] View A and view B shown in FIG. 1 illustrate in detail the latching mechanism 166. In an example embodiment, the latching mechanism 166 may be located on each side pipe of the handle 106. Accordingly, the latching mechanism 166 may consist of two latching mechanisms, one on the first side pipe 116 and one on the second side pipe 118 of the handle 106. The first latching mechanism 166 may be connected, by its first end, to a second end of the first connecting part 140. The second latching mechanism 166 may be connected, by its first end, to a second end of the second connecting part 204. The latching mechanism 166 may be further connected to the platform 110. Accordingly, the first latching mechanism 166 may be connected to the handle 106 and the platform 110.

[0052] In some example embodiments, the assembly 102 may have one latching mechanism 166 disposed on one of the side pipes of the handle 106.

[0053] The latching mechanism 166 may enable rotation of the self-winding hose reel 108 connected between the first side pipe 116 and the second side pipe 118 of the handle 106 with respect to the vertical shaft engine 114 and the water pump 112. Specifically, the latching mechanism 166 may be configured to enable the self-winding hose reel 108 to rotate, along with the rotation of the handle 106, between the first position, which is a substantially vertical position of the self-winding hose reel 108 and the handle 106, and the second position, which is a substantially horizontal position of the self-winding hose reel 108 and the handle 106. FIG. 1 shows the assembly 102 with the self-winding hose reel 108 in the first position, in which the self-winding hose reel 108 is disposed substantially vertically. The self-winding

hose reel 108 may be folded up into the vertical position when the assembly 102 is not in use, or when access to components located below the self-winding hose reel 108 is needed.

[0054] The assembly 102 may have other components required for the operation of the assembly 102, such as a spray nozzle 168 configured to control the shape and intensity of the water stream, a trigger gun 170, which is a high-pressure trigger gun for activating the flow of pressurized water from the water pump 112 to the spray nozzle 168, wheels 172 for easy maneuverability and transportation, a soap tank 174, and so forth.

[0055] FIG. 5 and FIG. 6 show the assembly 102 with the handle 106 in the second position, according to an example embodiment. FIG. 5 is a front perspective view of the assembly 102 with the handle 106 in the second position. FIG. 6 is a right side view of the assembly 102 with the handle 106 in the second position.

[0056] The handle 106 may be rotated from the first position shown in FIGS. 1-3, 4A, and 4B to the second position shown in FIGS. 5 and 6 using the latching mechanism 166. To rotate the handle 106, the holding part 120 of the handle 106 may be pushed in a direction 176 (shown by an arrow in FIG. 1 and FIG. 5) towards the resting part 144 of the handle 106.

[0057] When the handle 106 is in the second position, the first support part 138 and the second support part 202 may be disposed in a substantially horizontal position. Similarly, when the handle 106 is in the second position, the first connecting part 140 and the second connecting part 204 may be disposed in a substantially vertical position.

[0058] Upon rotation of the handle 106 into the second position, the self-winding hose reel 108 may be rotated from a position over the vertical shaft engine 114 to a position beside the vertical shaft engine 114. In an example embodiment, while the handle 106 is in the second position, the self-winding hose reel 108 may be disposed substantially below the vertical shaft engine 114. FIG. 6 shows the self-winding hose reel 108 disposed lower than the vertical shaft engine 114. Moreover, while the handle 106 is in the second position, the self-winding hose reel 108 may be disposed horizontally and parallel to the vertical shaft engine 114.

[0059] Referring to view A and view B in FIG. 1, view C in FIG. 4A, and view D in FIG. 5 illustrating the latching mechanism 166, the latching mechanism 166 may include a rotatable member 178, a latching plate 180, and a bolt 182 going through and connecting the latching plate 180 and the rotatable member 178. The rotatable member 178 may be connected to the first connecting part 140.

[0060] The rotatable member 178 may include a first plate 184 and a second plate 186 parallel each other. The rotatable member 178 may further include a connecting plate 188 that connects the first plate 184 to the second plate 186. In an example embodiment, the connecting plate 188 may be perpendicular to the first plate 184 and the second plate 186.

[0061] Each of the first plate 184 and the second plate 186 may have a slot 190. The latching plate 180 may have a first recess 192 and a second recess 194. When the assembly 102 is in the first position, the first recess 192 may be located in front of the slot 190 of the first plate 184.

[0062] The latching mechanism 166 may further include a latching pin 196. The latching pin 196 may be inserted into the slots 190. When the assembly 102 is in the first position,

the latching pin 196 may be retained by a spring 198 in a first position contacting a first end (a bottom end in view A and view B in FIG. 1) of the slots 190. In this position, the latching pin 196 may engage with the first recess 192 of the latching plate 180.

[0063] The assembly 102 may have two latching mechanisms 166, where one latching mechanism 166 may be secured to the middle of a first lateral side of the platform 110 and another latching mechanism 166 may be secured to the middle of a second lateral side of the platform 110, as shown in view A and view B in FIG. 1, view D in FIG. 5, and FIG. 4B. The assembly 102 may have a pedal 402 secured to the rear side of the platform 110, as shown in view C in FIG. 4A and in FIG. 4B.

[0064] The spring 198 may be connected to the middle of the latching pin 196 to hold the latching pin 196 in the first recess 192 (shown in view D in FIG. 5) in order to provide the first position of the handle 106 or hold the latching pin 196 in the second recess 194 (shown in view D in FIG. 5) to provide the second position of the handle 106. As the rotatable member 178 is connected to the first connecting part 140 of the handle 106, pushing the handle 106 in the direction 176 may cause rotation of the rotatable member 178. The angle of rotation of the rotatable member 178 may be rotated 90 degrees. When changing the position of the handle 106, with rotation of the handle 106, the edge profile of the latching plate 180 forces the spring-loaded latching pin 196 to slide to a second end (a top end in view A and view B in FIG. 1) of the slot 190 to move from the first recess 192 or the second recess 194 and skid over the edge of the latching plate 180.

[0065] FIGS. 4A and 4B illustrate the structure of the pedal 402. A pedal retention spring 404 may be placed on the handle locking pin 414 between the bracket 412 and a split pin 416. There may be a hole provided in the pipe (i.e., the second connecting part 204) with which the spring-loaded handle locking pin 414 engages, going through a hole in the platform 110.

[0066] The pedal 402 may be configured to secure the handle 106 when the handle 106 is in the first position, so the user can tilt the handle 106 to maneuver the assembly 102. When the handle 106 is unfolded from the second position to the first position, the pipe (i.e., the second connecting part 204) pushes the handle locking pin 414 to retract and then to engage with the hole in the pipe (i.e., the second connecting part 204) to secure the handle 106.

[0067] The pedal 402 may be activated at the same time when pushing the handle 106 in the direction 176. Specifically, the pedal 402 may be pressed by the foot of the user.

[0068] As shown in view D in FIG. 5, after the rotatable member 178 is rotated, the slot 190 may be located in front of the second recess 194. Accordingly, the latching pin 196 located in the slot 190 may be moved into the second recess 194. The spring 198 may cause movement of the latching pin 196 towards the first end (a right end in view D in FIG. 5) of the slot 190. In this position, the latching pin 196 extending through the slot 190 may engage with the second recess 194 of the latching plate 180. No further movement of the latching mechanism 166 is possible until unfolding the handle 106 into the first position. The engagement of the latching pin 196 with the second recess 194 may cause latching of the handle 106 in the second position.

[0069] Referring again to FIG. 4A, view C further shows a pedal retention spring 404 configured to return the pedal

402 into the initial position. The initial position of the pedal 402 when the pedal 402 is elevated over the platform 110 is shown in view C of FIG. 4A. The pedal 402 may be indirectly connected to the pedal retention spring 404 via a tapered plate 406 connected to the pedal 402, a first connecting plate 408 connected to the tapered plate 406, a holding member 410 connected to the first connecting plate 408, and a handle locking pin 414 connected to the holding member 410. The pedal retention spring 404 may be secured on the handle locking pin 414 by a split pin split pin 416. Pressing the pedal 402 may cause lateral movement of the handle locking pin 414 with the pedal retention spring 404 placed on the handle locking pin 414. A bracket 412 may be disposed on the handle locking pin 414 and secured to the platform 110. The pedal retention spring 404 may be located in the bracket 412. As the bracket 412 stays in place during the lateral movement of the handle locking pin 414, movement of the handle locking pin 414 may cause compressing of the pedal retention spring 404. When the force is no longer applied to the pedal 402 by the foot, the pedal retention spring 404 is uncompressed to its initial state. The uncompressing of the pedal retention spring 404 causes movement of the holding member 410 in the opposite direction, along with movement of the first connecting plate 408, tapered plate 406, and pedal 402 to an initial inactivated state.

[0070] As shown in FIG. 5 and FIG. 6, the self-winding hose reel 108 may have a water hose 502. The water hose 502 may be wound around the self-winding hose reel 108.

[0071] As shown in FIG. 3, the assembly 102 may further include a further water hose 302. The further water hose 302 may have a first end 304 configured to be connected to the water pump 112. The further water hose 302 may further have a second end 306.

[0072] The water hose 502 may have a third end 308 and a fourth end 310, as shown in FIG. 3. The third end 308 of the water hose 502 may be connected to the second end 306 of the further water hose 302. The fourth end 310 of the water hose 502 may be configured to be connected to the trigger gun 170.

[0073] As shown in FIG. 5, the water hose 502 may be extended from the self-winding hose reel 108 in the direction outwards from a front side of the assembly 102, as shown by an arrow 504.

[0074] The self-winding hose reel 108 may further have a housing including a front housing part 506 and a rear housing part 508 connected together. The housing may enclose the water hose 502. The housing may further have a fastener 510 configured to secure a water outlet 512 at an end of the water hose 502 of the self-winding hose reel 108 to the housing.

[0075] FIGS. 1-6 show the first side pipe 116 that is symmetrical and parallel to the second side pipe 118. In some example embodiments, the portions of the first side pipe 116 and second side pipe 118 may be symmetrical to each other with respect to a vertical symmetry plane, but may be not parallel to each other. For example, the first inclined part 122 and the second inclined part 124 may be not parallel, but may be directed towards each other and form sides of an isosceles trapezoid. Similarly, the third inclined part 130 and the fourth inclined part 132 may be symmetrical to each other with respect to a vertical symmetry plane, but may be not parallel to each other. For example, the third inclined part 130 and the fourth inclined

part 132 may be not parallel, but may be inclined towards each other and form sides of an isosceles trapezoid. Similarly, the first support part 138 and the second support part 202 may be symmetrical to each other with respect to a vertical symmetry plane, but may be not parallel to each other. For example, the first support part 138 and the second support part 202 may be not parallel, but may be inclined towards each other and form sides of an isosceles trapezoid. Similarly, the fifth inclined part 148 and the sixth inclined part 150 may be symmetrical to each other with respect to a vertical symmetry plane, but may be not parallel to each other. For example, the fifth inclined part 148 and the sixth inclined part 150 may be not parallel, but may be inclined towards each other and form sides of an isosceles trapezoid.

[0076] In some example embodiments, instead of having two side tubes, namely the first side pipe 116 and the second side pipe 118, the handle 106 may have one tube. The tube may connect by its upper end to the holding part 120 and may connect by its lower end to the platform 110 or to the bottom support 142.

[0077] FIGS. 7-11 illustrate an assembly 702 for high-pressure cleaning in form of a pressure washer powered by a horizontal shaft engine, according to an example embodiment. The assembly 702 is a horizontal type handle assembly 702 having a handle extending horizontally.

[0078] FIG. 7 is a front perspective view of the assembly 702, according to an example embodiment. FIG. 8 is a rear perspective view of the assembly 702, according to an example embodiment. FIG. 9 is a left side view of the assembly 702, according to an example embodiment. FIG. 10 is an upper view of the assembly 702, according to an example embodiment. FIG. 11 is a front view of the assembly 702, according to an example embodiment.

[0079] Referring to FIGS. 7-11, the assembly 702 may include a pressure washer 704, a handle 706 connected to the pressure washer 704, and a self-winding hose reel 708. The pressure washer 704 may further include an engine. Specifically, the pressure washer 704 may be powered by a horizontal shaft engine 710. Therefore, the assembly 702 is a horizontal shaft engine powered pressure washer with the self-winding hose reel 708. The pressure washer 704 may include a water pump 712 coupled to the horizontal shaft engine 710. The water pump 712 may be coupled to the horizontal shaft engine 710 along a horizontal axis 714 of the horizontal shaft engine 710. The horizontal shaft engine 710 may include a shaft 740 disposed horizontally. The horizontal axis 714 of the horizontal shaft engine 710 may be an axis of the shaft 740. Accordingly, the horizontal shaft engine 710 and the water pump 712 may be located along the same horizontal axis 714, which is an axis of the shaft 740 of the horizontal shaft engine 710. The water pump 712 may be coupled to the shaft 740.

[0080] The pressure washer 704 may further include a platform 716. The horizontal shaft engine 710 may be mounted onto the platform 716. In an example embodiment, the water pump 712 may be indirectly mounted onto the platform 716 by being connected to the horizontal shaft engine 710, but may not touch the platform 716 directly.

[0081] In an example embodiment, on the pressure washer 704 powered by the horizontal shaft engine 710, the horizontal shaft engine 710 can be mounted to the platform 716 using four bolts and nuts, then the water pump 712 can be slid on the shaft of the horizontal shaft engine 710 and secured to the horizontal shaft engine 710 using another four

bolts and nuts. In some example embodiments, the water pump 712 may be installed on the horizontal shaft engine 710 first, and then the combination of the horizontal shaft engine 710 and the water pump 712 may be mounted on the platform 716.

[0082] The handle 706 may be mounted onto the platform 716. The handle 706 may be configured to be used for maneuvering the platform 716 and the assembly 702 as a whole. The pressure washer 704 may include one of the following: an electrically powered high-pressure washer, a gasoline engine powered high-pressure washer, and any other type of pressure washer.

[0083] The self-winding hose reel 708 may be coupled to the pressure washer 704. The self-winding hose reel 708 may be disposed below the horizontal shaft engine 710. In an example embodiment, the horizontal shaft engine 710 may be located over a first surface 718 (a surface faced upwards) of the platform 716 and the self-winding hose reel 708 may be arranged on a second surface 720 (a surface faced downwards) of the platform 716 and below the horizontal shaft engine 710. Accordingly, the self-winding hose reel 708 may be mounted under the platform 716. The water pump 712 may be arranged over the first surface 718 of the platform 716. The self-winding hose reel 708 arranged on the second surface 720 of the platform 716 may be located below the water pump 712.

[0084] The handle 106 may have a curvilinear form and include several parts. In an example embodiment, the handle 106 may include a first side pipe 722 and a second side pipe 724. In some example embodiments, the first side pipe 722 may be parallel to the second side pipe 724. The first side pipe 722 may be secured to a first side of the platform 716 and second side pipe 724 may be secured to a second side of the platform 716.

[0085] The handle 106 may further include a holding part 726. The holding part 726 may be used by a user of the assembly 702 for holding the handle 706 by hands when maneuvering the assembly 702 by the user. The holding part 726 may connect the first side pipe 722 and the second side pipe 724 to each other.

[0086] The assembly 702 may have a first water hose 738. The first water hose 738 may have a first end 902 and a second end 904, as shown in FIG. 9. The first end 902 of the first water hose 738 may be connected to the water pump 712.

[0087] The assembly 702 may further have a second water hose 728. The second water hose 728 may be wound around the self-winding hose reel 708. The second water hose 728 may have a third end 808 and a fourth end 810, as shown in FIG. 8. The third end 808 of the second water hose 728 may be connected to the second end 904 of the first water hose 738. The second water hose 728 may be extended from the self-winding hose reel 708 in the direction outwards from a rear side of the assembly 702, as shown by an arrow 730 in FIG. 7.

[0088] As shown in FIG. 8, the assembly 702 may further have a front plate 802 connected to the pressure washer 704 at a predetermined angle with respect to the platform 716. The front plate 802 may cover the self-winding hose reel 708. In an example embodiment, an opening 816 may be made in the front plate 802. The second water hose 728 of the self-winding hose reel 708 may pass through an opening in the front plate 802. Specifically, the fourth end 810 of the

second water hose 728 may be configured to pass through the opening 816 in the front plate 802.

[0089] The assembly 702 may further include a fastener 804 mounted to the front plate 802 of the platform 716. The fastener 804 may be configured to secure the fourth end 810 of the second water hose 728 of the self-winding hose reel 708 to the front plate 802. Specifically, the second water hose 728 may have a water outlet 806 connected to the fourth end 810 of the second water hose 728 and configured to be secured in the fastener 804.

[0090] As shown in FIG. 10, the platform 110 may include an opening 1002. The self-winding hose reel 708 may include a water intake mechanism 1004. The water intake mechanism 1004 may extend through the opening 1002 in the platform 110. The water intake mechanism 1004 may connect the second end 904 of the first water hose 738 to the third end 808 of the second water hose 728. Specifically, the second end 904 of the first water hose 738 may connect to the water intake mechanism 1004 over the first surface 718 of the platform 110, and the third end 808 of the second water hose 728 may connect to the water intake mechanism 1004 under the second surface 720 of the platform 110. Accordingly, the water intake mechanism 1004 extending through the platform 110 may connect the first water hose 738 to the second water hose 728.

[0091] As shown in FIG. 9, the first water hose 738 may extend substantially vertically from the water intake mechanism 1004 of the self-winding hose reel 708 over the platform 110.

[0092] The assembly 702 may have other components required for the operation of the assembly 702, such as a spray nozzle 732 configured to control the shape and intensity of the water stream, a trigger gun 734 for activating the flow of pressurized water from the water pump 712 to the spray nozzle 732, wheels 736 for easy maneuverability and transportation, and so forth. The spray nozzle 732 may be connected to the trigger gun 734. The fourth end 810 of the second water hose 728 may be configured to be connected to the trigger gun 734, as shown in FIG. 8. Specifically, the trigger gun 734 may have an input port 812. The second water hose 728 may be configured to connect, by its fourth end 810, to the trigger gun 734, as schematically indicated by an arrow 814 in FIG. 8.

[0093] FIG. 12A and FIG. 12B illustrate a self-winding hose reel 708, according to an example embodiment. The self-winding hose reel 108 may be similar to the self-winding hose reel 708. FIG. 12A is a top view of the self-winding hose reel 708. FIG. 12B is a front cross-sectional view of the self-winding hose reel 708.

[0094] The self-winding hose reel 708 may include a sleeve shaft 1202 and a drum 1204 put on the sleeve shaft 1202. The self-winding hose reel 708 may further include a water intake 1206, a water outlet 1208, and a stop block 1210 disposed at the water outlet 1208.

[0095] The self-winding hose reel 708 may further include the second water hose 728 wrapped on the drum 1204. The stop block 1210 may be arranged around the second water hose 728 to prevent the second water hose 728 from being retracted completely into the self-winding hose reel 708. Specifically, the stop block 1210 may be connected to the second water hose 728 around the fourth end 810 of the second water hose 728. The stop block 1210 may be configured to prevent the fourth end 810 from passing

through the opening 816 (shown in FIG. 8) in the front plate 802 and from being retracted into the self-winding hose reel 708.

[0096] The self-winding hose reel 708 may further include a first spring 1212 placed around the sleeve shaft 1202 inside the drum 1204. In an example embodiment, the first spring 1212 may include a coil spring, a volute spring, and any other applicable type of spring. When pulling out the second water hose 728, the drum 1204 rotates and compresses the first spring 1212 around the sleeve shaft 1202, so that the compressed first spring 1212 can rotate the drum 1204 to automatically retract the second water hose 728.

[0097] The self-winding hose reel 708 may further have a pawl 1214. The pawl 1214 may be mounted on a pin 1216. The pawl 1214 may be pre-loaded by a second spring 1218 at the end, so that the spring-loaded pawl 1214 can swivel in a predetermined range. A first teathed edge 1220 and a second teathed edge 1222 may be arranged on the drum 1204 for engagement with the pawl 1214.

[0098] When pulling out the second water hose 728, the drum 1204 rotates clockwise and the first spring 1212 is compressed. The pawl 1214 may include a pawl face portion 1224 and a pawl back portion 1226. The pawl 1214 skids over the first teathed edge 1220 and the second teathed edge 1222 of the drum 1204 smoothly. When stopping pulling out the second water hose 728, the drum 1204 rotates counterclockwise slightly by the force of the compressed first spring 1212 until the pawl 1214 engages, by the pawl face portion 1224, one tooth on the first teathed edge 1220 or the second teathed edge 1222 to block the rotation.

[0099] To activate the automatic retraction of the second water hose 728, the second water hose 728 may be further pulled out for a predetermined distance until the pawl 1214 reaches either a first teeth-free area 1228 or a second teeth-free area 1230.

[0100] During the counterclockwise rotation of the drum 1204, the pawl back portion 1226 skids over the first teathed edge 1220 and the second teathed edge 1222, which does not block the rotation of the drum 1204, and the compressed first spring 1212 retracts the second water hose 728 automatically.

[0101] FIG. 13 is a flow chart of a method 1300 for manufacturing an assembly for high-pressure cleaning, according to an example embodiment. In some embodiments, the operations of the method 1300 may be combined, performed in parallel, or performed in a different order. The method 1300 may also include additional or fewer operations than those illustrated.

[0102] In block 1302, the method 1300 may commence with providing a pressure washer. The pressure washer may include a platform, an engine mounted onto the platform, and a water pump coupled to the engine. In block 1304, the method 1300 may include providing a handle for maneuvering the platform. The handle may be mounted onto the platform.

[0103] In block 1306, the method 1300 may proceed with providing a self-winding hose reel coupled to the pressure washer. In an example embodiment, the self-winding hose reel may be mounted on the handle. The handle may be configured to rotate with respect to the engine from a first position to a second position. While the handle is in the first position, the self-winding hose reel may be disposed above the engine. While the handle is in the second position, the self-winding hose reel may be disposed below the engine.

[0104] In an example embodiment, while the handle is in the first position, the self-winding hose reel may be disposed vertically with respect to the engine. While the handle is in the second position, the self-winding hose reel may be disposed parallel to the engine.

[0105] In an example embodiment, the handle may include a first side pipe and a second side pipe. The second side pipe may be parallel to the first side pipe. The self-winding hose reel may be secured between the first side pipe and the second side pipe.

[0106] The method **1300** may further optionally include providing, in block **1308**, a latching mechanism configured to latch the handle in the first position and latch the handle in the second position.

[0107] The method **1300** may further include providing a fastener mounted onto the housing of the self-winding hose reel. The fastener may be configured to secure an end of the self-winding hose reel to the housing.

[0108] FIG. **14** is a flow chart of a method **1400** for manufacturing an assembly for high-pressure cleaning, according to an example embodiment. In some embodiments, the operations of the method **1400** may be combined, performed in parallel, or performed in a different order. The method **1400** may also include additional or fewer operations than those illustrated.

[0109] In block **1402**, the method **1400** may commence with providing a pressure washer. The pressure washer may include a platform, an engine mounted onto the platform, and a water pump coupled to the engine.

[0110] The water pump may be coupled to the engine along a horizontal axis of the engine. In an example embodiment, the engine may include a shaft disposed horizontally. The horizontal axis of the engine may be an axis of the shaft. The water pump may be coupled to the shaft.

[0111] In block **1404**, the method **1400** may proceed with providing a handle for maneuvering the platform. The handle may be mounted onto the platform.

[0112] In block **1406**, the method **1400** may include providing a self-winding hose reel. The self-winding hose reel may be coupled to the pressure washer. In an example embodiment, the engine may be arranged over a first surface of the platform. The self-winding hose reel may be arranged on a second surface of the platform and below the engine.

[0113] In block **1408**, the method **1400** may include providing a first water hose having a first end and a second end. The first end of the first water hose may be connected to the water pump. In block **1410**, the method **1400** may proceed with providing a second water hose wound around the self-winding hose reel. The second water hose may have a third end and a fourth end. The third end of the second water hose may be connected to the second end of the first water hose.

[0114] In block **1412**, the method **1400** may optionally include providing a trigger gun. The fourth end of the second water hose may be configured to be connected to the trigger gun.

[0115] In an example embodiment, the platform may include an opening. The self-winding hose reel may include a water intake mechanism. The water intake mechanism may extend through the opening. The water intake mechanism may connect the second end of the first water hose to the third end of the second water hose. The first water hose may extend substantially vertically from the water intake mechanism of the self-winding hose reel.

[0116] The method **1400** may further optionally include providing a front plate connected to the pressure washer at a predetermined angle with respect to the platform. The method **1400** may optionally proceed with providing an opening made in the front plate. The fourth end of the second water hose may be configured to pass through the opening. The method **1400** may further optionally include providing a fastener mounted to the front plate. The fastener may be configured to secure the fourth end of the self-winding hose reel to the front plate.

[0117] In an example embodiment, the self-winding hose reel may further include a stop block. The stop block may be connected to the second water hose around the fourth end. The stop block may be configured to prevent the fourth end from passing through the opening in the front plate and from being retracted into the self-winding hose reel.

[0118] Thus, assemblies for high-pressure cleaning and methods for manufacturing assemblies for high-pressure cleaning have been described. Although embodiments have been described with reference to specific example embodiments, it will be evident that various modifications and changes can be made to these example embodiments without departing from the broader spirit and scope of the present application. Accordingly, the specification and drawings are to be regarded in an illustrative rather than a restrictive sense.

What is claimed is:

1. An assembly for high-pressure cleaning, the assembly comprising:

a pressure washer including:

- a platform;
- an engine mounted onto the platform; and
- a water pump coupled to the engine;

a handle for maneuvering the platform, the handle being mounted onto the platform;

a self-winding hose reel coupled to the pressure washer;

a first water hose having a first end and a second end, the first end of the first water hose being connected to the water pump; and

a second water hose wound around the self-winding hose reel, the second water hose having a third end and a fourth end, the third end of the second water hose being connected to the second end of the first water hose.

2. The assembly of claim 1, further comprising a trigger gun, wherein the fourth end of the second water hose is configured to be connected to the trigger gun.

3. The assembly of claim 1, wherein:

the engine is arranged over a first surface of the platform; and

the self-winding hose reel is arranged on a second surface of the platform and below the engine.

4. The assembly of claim 1, wherein the water pump is coupled to the engine along a horizontal axis of the engine.

5. The assembly of claim 4, wherein:

the engine includes a shaft disposed horizontally, the horizontal axis of the engine being an axis of the shaft; and

the water pump is coupled to the shaft.

6. The assembly of claim 1, wherein:

the platform includes an opening;

the self-winding hose reel includes a water intake mechanism, the water intake mechanism extending through the opening; and

the water intake mechanism connects the second end of the first water hose to the third end of the second water hose.

7. The assembly of claim 6, wherein the first water hose extends substantially vertically from the water intake mechanism of the self-winding hose reel.

8. The assembly of claim 1, further comprising:
a front plate connected to the pressure washer at a predetermined angle with respect to the platform; and
an opening made in the front plate;
wherein the fourth end of the second water hose is configured to pass through the opening.

9. The assembly of claim 8, further comprising a fastener mounted to the front plate, the fastener being configured to secure the fourth end of the self-winding hose reel to the front plate.

10. The assembly of claim 8, wherein:
the self-winding hose reel further includes a stop block;
the stop block is connected to the second water hose around the fourth end; and
the stop block is configured to prevent the fourth end from passing through the opening in the front plate and being retracted into the self-winding hose reel.

11. A method for manufacturing an assembly for high-pressure cleaning, the method comprising:
providing a pressure washer including:
a platform;
an engine mounted onto the platform; and
a water pump coupled to the engine;
providing a handle for maneuvering the platform, the handle being mounted onto the platform;
providing a self-winding hose reel coupled to the pressure washer;
providing a first water hose having a first end and a second end, the first end of the first water hose being connected to the water pump; and
providing a second water hose wound around the self-winding hose reel, the second water hose having a third end and a fourth end, the third end of the second water hose being connected to the second end of the first water hose.

12. The method of claim 11, further comprising providing a trigger gun, wherein the fourth end of the second water hose is configured to be connected to the trigger gun.

13. The method of claim 11, wherein:

the engine is arranged over a first surface of the platform;
and

the self-winding hose reel is arranged on a second surface of the platform and below the engine.

14. The method of claim 11, wherein the water pump is coupled to the engine along a horizontal axis of the engine.

15. The method of claim 14, wherein:

the engine includes a shaft disposed horizontally, the horizontal axis of the engine being an axis of the shaft;
and

the water pump is coupled to the shaft.

16. The method of claim 11, wherein:

the platform includes an opening;

the self-winding hose reel includes a water intake mechanism, the water intake mechanism extending through the opening; and

the water intake mechanism connects the second end of the first water hose to the third end of the second water hose.

17. The method of claim 16, wherein the first water hose extends substantially vertically from the water intake mechanism of the self-winding hose reel.

18. The method of claim 11, further comprising:

providing a front plate connected to the pressure washer at a predetermined angle with respect to the platform;
and

providing an opening made in the front plate;
wherein the fourth end of the second water hose is configured to pass through the opening.

19. The method of claim 18, further comprising providing a fastener mounted to the front plate, the fastener being configured to secure the fourth end of the self-winding hose reel to the front plate.

20. The method of claim 18, wherein:

the self-winding hose reel further includes a stop block;
the stop block is connected to the second water hose around the fourth end; and

the stop block is configured to prevent the fourth end from passing through the opening in the front plate and being retracted into the self-winding hose reel.

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