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United States Patent Application Publication

20250263268

Kind Code

A1

Publication Date

August 21, 2025

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SELF-WINDING HOSE REELS FOR PRESSURE WASHERS

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.

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Family ID: 1000008603844

Appl. No.: 19/202260

Filed: May 08, 2025

Related U.S. Application Data

parent US continuation-in-part 18882801 20240912 parent-grant-document US 12330182 child US 19202260

parent US continuation-in-part 18367680 20230913 PENDING child US 18882801

Publication Classification

Int. Cl.: B65H75/42 (20060101); B08B3/02 (20060101); B65H75/44 (20060101); B65H75/48 (20060101); F16L3/01 (20060101)

Background/Summary

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.

Description

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 to herein 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 **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.

Claims

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.
