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### Fluid sprayer with covered battery

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#### Abstract

A battery powered fluid sprayer includes a shelter that the battery is mounted in to provide power to the electric components of the sprayer. The shelter protects the battery from falling fluid droplets. The shelter extends above the battery and projects outward laterally and longitudinally to protect the battery. The battery can move vertically downward to dismount from the fluid sprayer.

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## Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS (1) This application is a continuation of U.S. application Ser. No. 17/839,032 filed Jun. 13, 2022, for “FLUID SPRAYER WITH COVERED BATTERY,” which in turn claims the benefit of U.S. Provisional Application No. 63/223,862 filed Jul. 20, 2021, and entitled “FLUID SPRAYER WITH COVERED BATTERY,” the disclosure of which is hereby incorporated by reference in its entirety.

### BACKGROUND

(1) The present disclosure relates generally to fluid sprayers. More specifically, the disclosure relates to battery powered fluid sprayers.

(2) Sprayers apply spray fluid to a surface through a nozzle. A pump draws the spray fluid from a reservoir, pressurizes the fluid, and drives the fluid downstream to a spray gun where the fluid is emitted as a spray through the nozzle. The pump can be powered in various manners, such as electrically, pneumatically, or hydraulically. Electrically powered pumps typically receive AC power from a power cord connected to a wall outlet to receive constant and unlimited electric power. Sprayers can be configured to spray various fluids such as paint, varnish, finishing, or other type of coating. The sprayed fluid can be a sanitary fluid, such as for sterilization, cleaning, deodorizing, or another health-related application.

### SUMMARY

(3) According to an aspect of the disclosure, a fluid sprayer configured to be powered by a battery, the fluid sprayer including an electric motor; a pump operatively connected to the electric motor to be powered by the electric motor; a housing within which the electric motor is disposed; a battery bay configured to receive the battery when the battery is mounted to the fluid sprayer; and a shelter defining a battery chamber configured to contain the battery, the shelter fully covering a top side of the battery with the battery mounted to the fluid sprayer.

(4) According to an additional or alternative aspect of the disclosure, a mounting assembly for a battery of a fluid sprayer includes a housing containing an electric motor and a shelter defining a battery compartment for receiving the battery. The shelter includes a mounting wall formed by the housing; a ceiling formed by the housing; and a guard projecting away from the housing such that an upper cavity having closed upper cavity lateral sides, closed upper cavity longitudinal sides, and a closed upper cavity upper side is formed by the back wall, the guard, and the ceiling, and such

that a vertical cavity having closed vertical cavity lateral sides and a closed vertical cavity back side is formed by the drive housing and the guard. The mounting wall is supporting the battery within the battery chamber such that the battery is partially disposed within each of the upper cavity and vertical cavity and air gaps are formed between the battery and the ceiling and between the battery and the guard such that the battery does not contact any of the ceiling and the guard.

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## Description

### BRIEF DESCRIPTION OF THE DRAWINGS

- (1) FIG. 1A is a side elevation view of a sprayer.
- (2) FIG. 1B is a first isometric view of the sprayer shown in FIG. 1A.
- (3) FIG. 1C is a second isometric view of the sprayer shown in FIG. 1B.
- (4) FIG. 2A is a front elevational view of a sprayer.
- (5) FIG. 2B is a cross-sectional view taken along line B-B in FIG. 2A.
- (6) FIG. 3A is an enlarged isometric view of a sprayer showing a battery mounted to the sprayer.
- (7) FIG. 3B is an enlarged isometric view of the sprayer shown in FIG. 3A showing the battery dismounted from the sprayer.

### DETAILED DESCRIPTION

(8) The present disclosure concerns electrically powered fluid sprayers. The fluid sprayer is powered by a battery mounted to the fluid sprayer. The battery provides electrical power for operation of components of the fluid sprayer, including an electric motor that powers a pump. The pump provides fluid under pressure (e.g., from a reservoir) to a spray gun. The fluid is emitted under pressure from a nozzle of the spray gun (e.g., a handheld spray gun) as a fluid spray. The sprayer is configured to protect the battery such that spray droplets are prevented from falling into or otherwise entering into the battery-sprayer interface. Moisture-sensitive components of the battery are thereby protected from fluid that could otherwise damage the battery. The sprayer includes surfaces that cover the battery-sprayer interface and enclose portions of the battery to prevent fluid from entering into the battery-sprayer interface. The battery powered sprayer can spray various fluids, such as paint, varnish, finishing, or other type of coating. The fluid sprayed can be a sanitary fluid, such as for sterilization, cleaning, deodorizing, or another health-related application.

(9) FIG. 1A is a side elevation view of fluid sprayer **10**. FIG. 1B is a first isometric view of fluid sprayer **10**. FIG. 1C is a second isometric view of fluid sprayer **10**. FIGS. 1A-1C will be discussed together. Fluid sprayer **10** and battery **12** are shown. Fluid sprayer **10** includes frame **14**, housing **16**, shelter **18**, spray hose **28**, spray gun **30**, and inlet hose **32**. Shelter **18** includes projection and guard **22**. Guard **22** forms side rails **24** and awning **26**. Spray gun **30** includes trigger **34** and handle **36**. Frame **14** includes frame base **38** and arms **40**. Each arm **40** include cross-bar **42**.

(10) Frame **14** supports other components of fluid sprayer **10** relative to a ground surface. Frame **14** includes frame base **38** that is oriented generally horizontally, parallel to the ground surface. Frame base **38** is formed by tubular legs in the example shown. Arms **40** extend vertically from the frame base **38**. Arms **40** include cross-bars that are disposed above housing **16**. Cross-bars **42** can be grasped by a user and utilized as a handle to move fluid sprayer **10** around and between job sites.

(11) Inlet hose **32** is configured to extend into a reservoir, such as a bucket, to draw spray fluid from a supply within the reservoir. The inlet hose **32** extends to a pump of the sprayer **10**. The pump increases a pressure of the spray fluid and drives the pressurized spray fluid downstream through spray hose **28** to spray gun **30**. Spray gun **30** includes a handle **36** that can be grasped by a single hand of the user. Trigger **34** is operably associated with an internal valve within the body of spray gun **30** to release spray fluid from a nozzle of the spray gun **30**. The pressure generated by the pump is configured to atomize the spray fluid into droplets for application to the target surface.

Some of the droplets do not adhere to the surface and instead deflect or bounce back. The droplets fall within the surrounding area of the surface, which can include sprayer. Such falling droplets can be referred to as “dry fall” or “overspray”.

(12) Housing **16** is connected to frame **14** such that housing **16** is supported above the ground surface and is not in contact with the ground surface. Various of the components of sprayer **10** are disposed within and/or supported by housing **16**. The electrical components of sprayer **10** are shielded from falling fluid spray. Electrical components powered by battery **12**, such as the electric motor of sprayer **10**, are disposed within the housing **16**.

(13) Battery **12** is mounted to fluid sprayer **10** to provide electric power to components of fluid sprayer **10**. The battery **12** is supported by the housing **16**. In some examples, the battery **12** can be directly mounted to the housing **16** such that the battery **12** hangs from the housing **16**. Battery **12** can be mechanically connected to the housing **16** to be supported by the housing **16**. The battery **12** is protected by shelter **18**. The shelter **18** covers all upward facing surfaces of the battery **12** to protect the battery **12** from falling spray fluid, such as paint “dry fall”, which could otherwise buildup and interfere with the battery **12**. While the shelter **18** protects the battery **12** from falling fluid, shelter **18** is configured such that the battery **12** is exposed to the ambient air to allow cooling and easy access for mounting and dismounting, as well as facilitating monitoring of the battery **12** (e.g., in embodiments in which the battery **12** displays an energy storage level).

(14) Shelter **18** can be at least partially formed as a portion of housing **16**. Shelter **18** is disposed on an opposite side of sprayer **10** from the outlet **44** from the pump to spray gun **30** and from inlet hose **32**. Shelter **18** can be considered to be formed at a front end of sprayer **10** while inlet hose **32** is at a rear end of sprayer **10**. Shelter **18** is disposed to enclose various portions of battery **12** and to cover various of the edges of battery **12**. In the example shown, shelter **18** extends longitudinally outward beyond an outer side of battery **12**, extends laterally relative to both lateral sides of battery **12**, and extends downward to cover an edge of the top of battery **12**. Projection **20** extends over a top side of battery **12** and the guard **22** wraps around the lateral and outer sides of the battery **12**. Projection **20** fully covers the top side of battery **12** and guard **22** partially covers each of the lateral sides and outer side of battery **12**.

(15) Sprayer **10** can be configured such that shelter **18** is formed by the same material as housing **16**. For example, the material forming shelter **18** can be formed contiguous with the material forming housing **16**. The projection **20** can be formed at least partially from the same piece and material that forms the housing **16**. Other parts of the shelter **18**, such as guard **22**, can be formed by the guard piece **46**, which can be on or more pieces of material attached to the material that forms the housing **16**. In the example shown, guard piece **46** is mounted to housing **16** to form components of shelter **18**. In the example shown, side rails **24** and awning **26** are formed by guard piece **46** while projection **20** is formed continuous with and as part of the material of housing **16**.

(16) At least a portion of shelter **18** is formed above the battery **12**. Projection **20** extends outward from the portion of housing **16** containing the electric motor to cover a top of battery **12**, which is a side of battery **12** that faces upwards with battery **12** mounted to sprayer **10**. Projection **20** extends away from housing **16** to form at least a portion of shelter **18**. Guard **22** extends away from housing **16** to form partially enclosed cavities of the shelter **18**. In the example shown, guard **22** extends from a housing **16** disposed above battery **12** and on the lateral sides of battery **12**. Guard **22** projects downward such that the top side of battery **12** is fully enclosed and projects forward such that lateral sides of battery **12** are at least partially covered. Awning **26** and side rails **24** are formed as portions of guard **22**. In the example shown, side rails **24** and awning **26** are formed contiguous with each other such that guard **22** is a unitary projection extending on three side of battery **12**. In some examples, guard piece **46** can be formed as multiple components fixed relative to each other, such as in a clamshell configuration.

(17) Guard **22** extends below the top edge of battery **12** such that guard **22** at least partially covers an outer side of battery **12** that faces outward from shelter **18**. Specifically, awning **26** extends

downward to at least partially cover the outer side of battery 12. Awning 26 further wraps around the sides of battery 12 to at least partially cover the lateral sides of battery 12. Guard 22 also extends outward such that guard 22 at least partially covers the lateral sides of battery 12. Specifically, side rails 24 are disposed on the two lateral sides of battery 12 and extend relative to housing 16 such that at least a portion of the battery 12 is disposed in a cavity formed directly between side rails 24. Side rails 24 project over a portion of each lateral side of the battery 12. In the example shown, guard 22 includes two side rails 24 (only one of which is shown in FIGS. 1A and 1B) that are disposed on opposite lateral sides of the battery 12. While the projection 20 protects the battery 12 from falling spray fluid, the guard 22 can protect from spray fluid directed or drifting laterally or longitudinally toward the battery 12.

(18) Sprayer 10 provides significant advantages. Shelter 18 protects battery 12 from falling and drifting fluid spray. Shelter 18 fully or partially encloses various surfaces of battery 12 to protect the battery-sprayer interface from the fluid spray. The battery-sprayer interface is enclosed and surfaces of battery 12 are shielded to prevent fluid from accessing the electrical connections at the battery-sprayer interface. The battery 12 is mounted such that battery 12 is protected, while portions of battery 12 are exposed for easy access by the user to allow for battery 12 to be removed for charging and/or replacement.

(19) FIG. 2A is a front elevational view of sprayer 10 including the battery 12. FIG. 2B is a cross-sectional view taken along line B-B in FIG. 2A. FIGS. 2A and 2B will be discussed together. Frame 14, housing 16, shelter 18, inlet hose 32, pump 70, drive 90, motor 92, and battery bay 48 of sprayer 10 is shown. Shelter 18 includes projection 20, guard 22, ceiling 50, and mount wall 52. Guard 22 includes side rails 24 and awning 26. Awning 26 includes lateral rails 54 and front rail 56. Shelter 18 defines battery receiving area 58. Top side 60 (FIG. 2B), lateral sides 62 (FIG. 2A), outer side 64, bottom side 66, and mounting side 68 (FIG. 2B) of battery 12 are shown. X-Z coordinate axes are shown in FIG. 2A. The X axis is a lateral axis and the Z axis is a vertical axis. Y-Z coordinate axes are shown in FIG. 2B. The Y axis is a longitudinal axis and the Z axis is a vertical axis.

(20) Battery 12 is mounted to fluid sprayer 10 to provide electric power to various components of fluid sprayer 10. Specifically, battery 12 is electrically connected to motor 92 to provide operating power to motor 92. Electric motor 92 is located entirely within the housing 16 in the example shown. The motor 92 is powered by the battery 12. The motor 92 outputs rotational motion to the drive 90, which is configured to translate the rotational output from motor 92 into a linear reciprocating input to the fluid displacer of pump 70. For example, drive 90 can be an eccentric and crank that converts rotational motion to reciprocating motion. The drive 90 is connected to pump 70 to cause pumping by pump 70. Pump 70 in the example shown includes a piston 72 that is reciprocated by the drive 90 within a cylinder 74 while dual ball check valves control fluid flow.

(21) As shown, the pump 70 is located vertically above the battery 12 and the shelter 18. The pump 70, and further the fluid inlet and outlet of pump 70, are located on the opposite side of the housing 16 from the battery 12. The pump 70 and fluid inlet and fluid outlet of pump 70 are disposed on an opposite side of motor 92 from shelter 18.

(22) Battery 12 is disposed within battery receiving area 58 of shelter 18. Battery receiving area 58 can also be referred to as a battery chamber. In the example shown, the battery receiving area 58 is not located on the bottom of the housing 16. The battery receiving area 58 is not located on the bottom of the sprayer 10. The battery receiving area 58 is not located underneath the sprayer 10 or housing 16 except to the extent that the battery 12 is underneath the projection 20 that extends from a side of housing 16. Battery 12 is mounted such that mounting side 68 of battery 12 interfaces with sprayer 10. Specifically, mounting side 68 of battery 12 interfaces with a battery bay 48 formed in mount wall 52 to connect battery 12 to sprayer 10. The interface between battery 12 and sprayer 10 can be referred to as a battery-sprayer interface. Battery 12 is connected to sprayer 10 by interfacing with connector 76 formed in battery bay 48. Battery bay 48 is formed as a mounting

slot that battery **12** can be inserted into to mechanically and electrically connect battery **12** to sprayer **10**.

(23) Battery **12** is mechanically connected to sprayer **10** at battery bay **48** to physically support battery **12** on sprayer **10**. Battery **12** is electrically connected to components of sprayer **10** by electrical connections formed at battery bay **48**. Battery **12** enters into and is removed from battery bay **48** through lower opening **78** (shown in FIG. 3B) of battery bay **48**. Battery **12** is configured to move vertically (e.g., along an axis parallel to vertical axis Z) during mounting of battery **12** and dismounting of battery **12**. Battery **12** includes a mounting latch that, when released, allows the battery **12** to fall downward due to gravity. No floor or other part of the sprayer **10** blocks the downward fall of the battery **12**.

(24) Battery **12** is disposed at a first end of fluid sprayer **10** opposite a second end that inlet hose **32** is disposed at, and thus opposite any reservoir. In the example shown, the battery bay **48** is not located on the bottom of the housing **16**. The battery bay **48** is not located on the bottom of the sprayer **10**. The battery bay **48** is not located underneath the sprayer **10** or housing **16** except to the extent that the battery **12** is underneath the projection **20** that extends from a side of housing **16**.

(25) The portion of housing **16** that houses the electric motor **92** is disposed between battery **12** and inlet hose **32**. The motor **92** is disposed such that the motor **92** longitudinally overlaps with battery **12**. As such, the motor **92** is disposed such that a line parallel to the longitudinal Y-axis extends through each of the motor **92** and the battery **12**. The bottom side **66** of battery hangs below the lower opening **78** of battery bay **48** such that the lower opening **78** is not exposed from the front side of shelter **18** but is instead shielded by battery **12** itself. Battery **12** is mounted to sprayer **10** such that air gaps are disposed on five of six sides of battery **12**.

(26) Mount wall **52** is disposed vertically or substantially vertically (e.g., within 15-degrees of vertical). The mount wall **52** is disposed substantially vertically to facilitate any fluid that does enter into battery receiving area **58** flowing downward, in the direction of gravity, and away from battery bay **48**. Mount wall **52** extends vertically below the bottom side **66** of battery **12** to facilitate fluid draining away without pooling near battery **12**. As discussed in more detail below with regard to FIGS. 3A and 3B, battery bay **48** is formed in a protrusion of the mount wall **52**. The protrusion extends away from the mount wall **52** and into the battery receiving area **58**. The protrusion spaces the lower opening **78** of battery bay **48** longitudinally from a base portion of mount wall **52**. Spacing the lower opening **78** from mount wall **52** further inhibits any potential fluid migration or wicking to battery **12**.

(27) In the example shown, shelter **18** is formed from projection **20** and guard **22**. Projection **20** is formed as an outward projection of the housing **16**. The projection **20** extends outward relative to other portions of the housing **16**.

(28) Projection **20** extends from housing **16**. Projection **20** extends longitudinally away from the portion of housing **16** that motor **92** is disposed within. Projection **20** extends to form a top portion of shelter **18** that protects battery **12** from falling fluid spray. Battery **12** is disposed below projection **20** and is spaced from projection **20**. Projection **20** defines a ceiling **50** that extends beyond the battery **12**. The ceiling **50** extends beyond the battery **12** both beyond outer side **64** (longitudinally along axis Y) and laterally beyond lateral sides **62** (laterally along axis X). The area of ceiling in an X-Y horizontal plane is larger than the area of battery **12** in an X-Y horizontal plane such that ceiling **50** fully covers battery **12**. Upper gap **80** is disposed vertically between battery **12** and projection **20**. Specifically, upper gap **80** is disposed between top side **60** of battery **12** and ceiling **50**. As shown, the ceiling **50** is angled inward, toward the main body of the housing **16**. Ceiling **50** slopes such that the size of upper gap **80** is larger at outer side **64** of battery **12** than at mounting side **68** of battery **12**. It is understood, however, that in other examples the ceiling **50** can be sloped downward away from the main body of housing **16**, such that the end of ceiling **50** at awning **26** is vertically lower than the end at mount wall **52**.

(29) Guard piece **46** is mounted to housing **16** to form at least a portion of shelter **18**. Side rails **24**

and awning **26** are formed by guard piece **46**. Guard piece **46** wraps around projection **20**. Guard **22** is formed as a protective rail that extends relative to housing **16**. Side rails **24** are disposed on and spaced from lateral sides **62** of battery **12**. Awning **26** is disposed forward of and spaced from outer side **64** of battery **12**. Awning **26** is further disposed laterally outward from and spaced from lateral sides **62** of battery **12**. In the example shown, side rails **24** and awning **26** are formed by guard piece **46**, though it is understood that one or more of each side rail **24** and awning **26** can be formed as part of and unitary with the material forming housing **16**.

(30) Guard **22** extends around three sides of battery **12**. Specifically, guard **22** extends over the two lateral sides **62** of battery and outer side **64** of battery **12** to at least partially cover each of the lateral sides **62** and outer side **64**. Guard **22** covers first and second edges of each lateral side **62**, the first edge being a rear edge between the lateral side **62** and mounting side **68**, and the second edge being a top edge between lateral side **62** and top side **60**. Guard **22** covers the top edge of outer side **64** that is disposed between outer side **64** and top side **60**. Guard **22** covers three of the four edges of the top side **60**. Guard **22** partially covers the edges disposed between lateral sides **62** and outer side **64**. Guard **22** has a greater vertical length than the height of battery **12** taken between bottom side **66** and top side **60**.

(31) Battery **12** is disposed laterally between side rails **24**. Side rails **24** extend longitudinally relative to mount wall **52**. The vertically lower ends of side rails **24** are disposed vertically below the bottom side **66** of battery **12**. The battery **12** does not contact the side rails **24**. As such, lateral gaps **82** are formed between the lateral sides **62** of battery **12** and side rails **24**. Lateral gaps **82** are formed as voids disposed on both lateral sides **62** of battery **12**. Neither lateral side **62** of battery **12** contacts the guard **22**. The lateral gaps **82** space battery **12** from side rails **24** to avoid fluid that may be running down the guard **22** from wicking to the moisture-sensitive battery **12**.

(32) Awning **26** projects vertically downward relative to ceiling **50**. Awning **26** projects further vertically than the vertical height of upper gap **80**. As such, upper gap **80** is fully enclosed. Awning projects vertically downward to cover the edges of top side **60**. Awning **26** projects vertically downward such that the edges of top side **60** are fully enclosed within an upper portion of the battery receiving area **58**. Fully enclosing top side **60** prevents spray fluid from settling on top side **60**, thereby preventing accumulation that could otherwise pool and flow to the battery-sprayer interface.

(33) Top gap **84** is formed between awning **26** and battery **12**. Top gap **84** extends around three sides of battery **12**, such that an outer portion of top gap **84** is disposed between outer side **64** and a front rail **56** of awning **26** and such that lateral portions of top gap **84** are disposed between lateral sides **62** of battery **12** and lateral rails **54** of awning **26**. Top gap **84** facilitates airflow around battery **12** to provide cooling to battery **12** while also preventing fluid droplets from traveling to top side **60** because the droplets would have to flow against gravity through the top gap **84** to access the top side **60**.

(34) Non-contact between battery **12** and projection **20** and between battery **12** and guard **22** avoids fluid that may be running down these surfaces from wicking to the battery **12**, thereby protecting the battery **12**. Also, such separation allows for air flow around the battery **12** and thus cooling of the battery **12**, which may otherwise experience heat rise during intense, continuous operation.

(35) Shelter **18** defines the battery receiving area **58** that the battery **12** is disposed within. The battery receiving area **58** includes a vertical cavity **86** into which the battery **12** is elevated and shifts vertically though during install. The vertical cavity **86** is open longitudinally such that battery **12** projects out of vertical cavity **86** while battery **12** is mounted to sprayer **10**. Vertical cavity **86** is open on a lower vertical side to allow battery **12** to shift vertically into and out of vertical cavity **86** during mounting and dismounting of battery **12**. Vertical cavity **86** is closed at a top end by ceiling **50**. The battery receiving area **58** further includes an upper cavity **88** that the top side **60** of battery **12** is disposed within while the battery **12** is mounted to sprayer **10**. The upper cavity **88** is formed by awning **26** and ceiling **50**. The upper cavity **88** encloses the top side **60** of battery **12** to protect



the battery **12** from falling spray fluid. The upper cavity **88** is closed on five of six sides of upper cavity **88**. The upper cavity **88** is open on a bottom vertical side, oriented towards the ground surface to allow the battery **12** to pass into and out of upper cavity **88** during mounting and dismounting of battery **12**. The upper cavity **88** and vertical cavity **86** being partially enclosed cavities protects the moisture-sensitive areas of battery **12** from falling and/or drifting fluid spray, while leaving battery **12** exposed for easy access for removal and installation. The upper cavity **88** and vertical cavity **86** intersect and overlap in an upper area of battery receiving area **58**.

(36) Battery receiving area **58** is open on a bottom side directly below battery **12**. Shelter **18** does not include a floor and does not cover the bottom side **66** of battery **12**. The bottom side **66** of battery **12** is exposed such that the bottom side **66** of battery **12** can be accessed by the user for mounting and dismounting without manipulating other components of sprayer **10**. The absence of a floor allows the battery **12** to be removed and installed vertically (along axis Z). The absence of a floor also prevents the trapping of fluid in or near the battery bay **12** which otherwise risks pooling and potential exposure of the battery **12** to the fluid if the sprayer **10** were picked up or otherwise changed in orientation. The lower end of battery receiving area **58**, and of vertical cavity **86**, is open to facilitate fluid exiting from the battery receiving area **58** if any overspray did enter into the battery receiving area **58**.

(37) Sprayer **10** does not include an enclosure that fully encloses battery **12** within battery receiving area **58**. In the example shown, no door protects the battery **12**. To the extent that the battery **12** is protected by the shelter **18**, it is protected by static structures, not articulating structures such as a door or window. This avoids introducing hinges and other potential failure points and avoids introducing components that can accumulate the spray fluid over time. As explained above, the battery **12** is still protected by fluid spray hazards despite not being behind a door. Further, sprayer **10** not including a door means that battery can be accessed for removal and installation without having to manipulate or actuate other components of sprayer **10** prior to accessing battery **12**. User access to battery **12** thus requires less time and effort, simplifying the removal and installation processes. Having no door facilitates cooling of battery **12** by allowing ambient airflow around the enclosed portions of battery **12**.

(38) Battery **12** is mounted such that battery **12** is protected from any falling and drifting fluid droplets. While moisture-sensitive portion of battery **12** are enclosed, such as mounting side **68** and top side **60** (along which fluid can flow to mounting side **68**), various other portions of battery are exposed to facilitate mounting and dismounting of battery **12**. In the example shown, a majority of the surface area of outer side **64** of battery **12** is exposed and a minority of the surface area of outer side **64** is enclosed. The enclosed portions of outer side **64** are covered by guard **22**. In the example shown, a majority of the surface area of each lateral side **62** of battery **12** is exposed and a minority of the surface area of outer side **64** is enclosed. The enclosed portions of lateral sides **62** are covered by guard **22**. The user can access battery **12** by grasping any of the exposed portions of battery **12** and pulling battery **12** vertically downward and away from ceiling **50**. The majority of each of lateral sides **62** and outer side **64** being exposed provides a large grip area for the user that facilitates single-hand installation and removal while also protecting the moisture-sensitive surfaces of battery **12**.

(39) As best seen in FIG. 2B, battery **12** is disposed within battery receiving area **58** and mounted to sprayer **10** such that battery **12** is neither higher nor lower than the portions of housing **16** containing motor **92**. As such, a full vertical height of battery is overlapped by housing **16** with battery **12** mounted to sprayer **10**.

(40) Sprayer **10** provides significant advantages. Battery **12** is disposed within battery receiving area **58** such that the portion of battery **12** interfacing with sprayer **10** is shielded from any falling and/or drifting fluid droplets. Battery **12** is fully covered by projection **20** such that top side **60** of battery **12** is not exposed outside of shelter **18**. All edges of top side **60** are enclosed within battery receiving area **58** such that fluid cannot drift onto or land on top side **60**, thus preventing pooling

on or flow along top side **60** to the mounting side **68** of battery **12**. The edges between lateral sides **62** and mounting side **68** and between top side **60** and mounting side **68** are fully enclosed within battery receiving area **58** such that fluid droplets are inhibited from moving to the moisture-sensitive components of battery **12**. While battery **12** is protected from fluid, portions of battery **12** are exposed to facilitate easy access to the battery **12** by the user, allowing for mounting and dismounting without actuating other components to access battery receiving area **58**. Battery **12** is also exposed to the ambient environment such that the ambient air can flow to and over battery **12**, facilitating cooling of battery **12**.

(41) FIG. **3A** is an enlarged isometric view of sprayer **10** showing the battery **12** mounted to the sprayer **10**. FIG. **3B** is an enlarged isometric view of sprayer **10** similar to FIG. **3A** but showing the battery **12** dismounted from the sprayer **10**. Battery **12** is mounted to sprayer **10** within battery receiving area **58**. Specifically, battery **12** mounts to sprayer **10** by interfacing with sprayer **10** within battery bay **48**. Battery **12** is mechanically and electrically mounted to sprayer **10** at battery bay **48**. Specifically, battery **12** is connected to sprayer **10** by interfacing with connector **76** formed in battery bay **48**.

(42) Battery **12** is connected to mounting wall **52**. Battery bay **48** is formed in protrusion **94** that extends from base **96** of mounting wall **52**. Specifically, protrusion **94** projects longitudinally relative to the base **96** of mounting wall **52**. Protrusion **94** extends into battery receiving area **58** from mounting wall **52**. Protrusion **94** can be formed as a portion of housing **16**. Protrusion **94** can be formed unitary with and from the same material piece as housing **16**. Protrusion **94** extends longitudinally such that battery bay **48** is spaced longitudinally from base **96** of mounting wall **52**. Specifically, lower opening **78**, through which battery **12** initially enters into battery bay **48**, is spaced longitudinally from the surface forming the base **96** of mounting wall **52**. Spacing battery bay **48** longitudinally from that base **96** of mounting wall **52** encourages fluid flow downward away from the battery bay **48** and prevents fluid from wicking to the moisture-sensitive components of battery **12**. The battery **12** connects to connector **76** within protrusion **94**. The connector **76** provides mechanical support to the battery **12** and also makes electrical connections to transfer power from the battery **12** to the electrical components of the sprayer **10** inside the housing **16**. For example, the battery **12** can connect to connector **76** by a mounting latch that, when released, allows the battery **12** to fall downward due to gravity. No floor or other part of the sprayer **10** blocks the downward fall of the battery **12**.

(43) Battery **12** is mounted and dismounted by shifting battery **12** vertically along a vertical Z axis, such as along a mounting axis oriented vertically. Battery **12** is dismounted by moving vertically downward. For example, a user can access the uncovered portions of lateral sides **62** and outer side **64** and/or the fully uncovered bottom side **66** to grasp battery **12**. The user can mechanically disconnect battery **12** from sprayer **10** and then pull battery **12** downward out of battery bay **48**. To reconnect the battery **12** (or mount a different battery **12**) to the sprayer **10**, the battery **12** is placed below the shelter **18** and then moved upwards into the battery receiving area **58** such that a portion of battery **12** enters into battery bay **48** to engage the connector **76** with complementary mechanical and electrical connections of the battery **12**.

(44) The battery **12** can be mounted by dual-directional movement. In the example shown, the awning **26** extends downward to cover an outward facing side **64** of the battery **12**. During mounting, the battery **12** is moved in a forward-then-up motion (e.g., longitudinally along the Y-axis and then vertically along the Z-axis) so that the battery **12** clears the downward extending part of the awning **26**. To dismount the battery **12**, the battery **12** is moved in a downward-then-back motion (e.g., vertically along the Z-axis and then longitudinally along the Y-axis) to again clear the downward extending part of the awning **26**.

Discussion of Non-Exclusive Examples

(45) The following are non-exclusive descriptions of possible examples of the present invention.

(46) A fluid sprayer configured to be powered by a battery, the fluid sprayer includes an electric

motor; a pump operatively connected to the electric motor to be powered by the electric motor; a housing within which the electric motor is disposed; a battery bay configured to receive the battery when the battery is mounted to the fluid sprayer; and a shelter defining a battery chamber configured to contain the battery, the shelter fully covering a top side of the battery with the battery mounted to the fluid sprayer to protect the battery from falling spray fluid.

(47) The fluid sprayer of the preceding paragraph can optionally include, additionally and/or alternatively, any one or more of the following features, configurations and/or additional components:

(48) The shelter includes a ceiling located directly over the battery, the ceiling formed by the housing.

(49) The shelter does not include a floor directly below the battery.

(50) The shelter includes a first side rail on a first lateral side of the battery and a second side rail on a second lateral side of the battery such that the battery is disposed directly between the first side rail and the second side rail.

(51) The first lateral side of the battery is partially exposed and the second lateral side of the battery is partially exposed.

(52) A first lateral gap is formed between the first side rail and the first lateral side of the battery such that the battery does not contact the first side rail, and a second lateral gap is formed between the second side rail and the second lateral side of the battery such that the battery does not contact the first side rail.

(53) The shelter includes an awning that projects downward relative to a ceiling of the shelter and at least partially defines the battery chamber.

(54) The awning is disposed on a front side of the shelter, a first lateral side of the shelter, and a second lateral side of the shelter.

(55) The awning projects downward beyond a top surface of the battery such that the awning partially covers the first lateral side of the battery, the second lateral side of the battery, and an outer side of the battery oriented away from the housing.

(56) The awning is spaced from and does not contact the battery.

(57) The battery is exposed with the battery mounted to the fluid sprayer.

(58) Each of an outer surface of the battery, a first lateral surface of the battery, and a second lateral surface of the battery are partially exposed.

(59) The battery is mounted on a wall that is one of vertical and substantially vertical.

(60) The wall is formed by the housing.

(61) The battery does not contact any surfaces other than the wall while mounted.

(62) The battery bay is formed in a protrusion of the wall, the protrusion projecting from the wall into the battery chamber such that the battery bay is spaced from a base of the wall.

(63) The battery bay is oriented vertically and includes a lower mounting opening such that the battery enters into and exits from the battery bay by vertical movement.

(64) The shelter is at least partially formed by a guard piece mounted to the housing.

(65) A guard of the guard piece projects away from the housing such that that guard at least partially encloses portions of the battery chamber.

(66) The guard includes a first side rail extending over a first lateral side of the battery to partially cover the first lateral side of the battery; a second side rail extending over a second lateral side of the battery to partially cover the second lateral side of the battery; and an awning extending over an outer side of the battery, the first lateral side of the battery, and the second lateral side of the battery to partially cover each of the outer side of the battery, the first lateral side of the battery, and the second lateral side of the battery.

(67) The guard is spaced from the battery such that the battery does not contact the guard.

(68) A mounting assembly for a battery of a fluid sprayer includes a housing containing an electric motor; and a shelter defining a battery compartment for receiving the battery. The shelter includes a

mounting wall formed by the housing; a ceiling formed by the housing; and a guard projecting away from the housing such that an upper cavity having closed upper cavity lateral sides, closed upper cavity longitudinal sides, and a closed upper cavity upper side is formed by the back wall, the guard, and the ceiling, and such that a vertical cavity having closed vertical cavity lateral sides and a closed vertical cavity back side is formed by the drive housing and the guard. The mounting wall is supporting the battery within the battery chamber such that the battery is partially disposed within each of the upper cavity and vertical cavity and air gaps are formed between the battery and the ceiling and between the battery and the guard such that the battery does not contact any of the ceiling and the guard.

(69) The mounting assembly of the preceding paragraph can optionally include, additionally and/or alternatively, any one or more of the following features, configurations and/or additional components:

(70) The guard is formed by a guard piece mounted to the housing.

(71) The shelter does not include a floor.

(72) While the invention(s) has been described with reference to an exemplary embodiment(s), it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention(s) without departing from the essential scope thereof. Therefore, it is intended that the invention(s) not be limited to the particular embodiment(s) disclosed, but that the invention(s) may include all embodiments falling within the scope of the appended claims. Any single feature, or any combination of features from one embodiment shown herein, may be utilized in a different embodiment independent from the other features shown in the embodiment herein. Accordingly, the scope of the invention(s) and any claims thereto are not limited to the particular to the embodiments and/or combinations of the features shown herein, but rather can include any combination of one, two, or more features shown herein.

## Claims

1. A fluid sprayer configured to be powered by a battery, the fluid sprayer comprising: an electric motor; a pump operatively connected to the electric motor to be powered by the electric motor; a housing within which the electric motor is disposed; a battery bay configured to receive the battery when the battery is mounted to the fluid sprayer; and a shelter defining a battery chamber configured to contain the battery, the shelter fully covering a top side of the battery with the battery mounted to the fluid sprayer to protect the battery from falling spray fluid, the shelter including a ceiling located directly over the battery chamber and at least partially defining the battery chamber, the ceiling extending longitudinally and laterally beyond a top side of the battery with the battery mounted to the fluid sprayer; wherein the battery chamber includes a first opening oriented vertically and a second opening oriented longitudinally away from the housing; wherein the battery chamber extends vertically below the battery such that a bottom side of the battery is disposed vertically above a lower end of the housing with the battery mounted to the fluid sprayer; and wherein the shelter is configured such that the shelter at least partially covers a first lateral side of the battery and a second lateral side of the battery with the battery mounted to the fluid sprayer, and the shelter is spaced from the battery with the battery mounted to the fluid sprayer such that air gaps are formed between the shelter and the first lateral side of the battery and between the shelter and the second lateral side of the battery.

2. The fluid sprayer of claim 1, wherein the ceiling is formed by the housing.

3. The fluid sprayer of claim 1, wherein the shelter does not include a floor directly below the battery.

4. The fluid sprayer of claim 1, wherein the shelter includes a first side rail on a first lateral side of

the battery and a second side rail on a second lateral side of the battery such that the battery is disposed directly between the first side rail and the second side rail.

5. The fluid sprayer of claim 1, wherein the battery extends outside of the battery chamber with the battery mounted to the fluid sprayer.

6. The fluid sprayer of claim 5, wherein each of an outer side of the battery, the first lateral side of the battery, and the second lateral side of the battery are partially exposed outside of the battery chamber.

7. The fluid sprayer of claim 1, wherein the battery bay is disposed on a wall formed by the housing.

8. The fluid sprayer of claim 7, wherein the wall is one of vertical and substantially vertical.

9. The fluid sprayer of claim 7, wherein the battery does not contact any surfaces defining the battery chamber other than the wall while mounted to the fluid sprayer.

10. The fluid sprayer of claim 7, wherein the battery bay is formed in a protrusion of the wall, the protrusion projecting from the wall into the battery chamber such that the battery bay is spaced from a base of the wall.

11. The fluid sprayer of claim 1, wherein the shelter is at least partially formed by a guard piece mounted to the housing, and wherein a guard of the guard piece projects away from the housing such that that guard at least partially encloses portions of the battery chamber.

12. The fluid sprayer of claim 1, further comprising: a frame connected to the housing, the frame configured to support the housing relative to a support surface.

13. The fluid sprayer of claim 12, wherein the frame includes at least one leg.

14. The fluid sprayer of claim 1, further comprising: a first handle and a second handle, the first handle and the second handle configured to be grasped during lifting of the fluid sprayer.

15. The fluid sprayer of claim 1, further comprising: a spray gun including a trigger configured to control release of the fluid from the spray gun; and a hose extending between and fluidly connecting the pump and the spray gun.

16. The fluid sprayer of claim 1, wherein the battery bay is oriented vertically and includes a lower mounting opening such that the battery can enter into the battery bay by vertical movement towards the ceiling and such that the battery can exit from the battery bay by vertical movement away from the ceiling.

17. The fluid sprayer of claim 1, wherein the battery chamber is not defined by an articulating structure.

18. The fluid sprayer of claim 1, wherein the pump is at least partially disposed in the housing.

19. A fluid sprayer configured to be powered by a battery, the fluid sprayer comprising: an electric motor; a pump operatively connected to the electric motor to be powered by the electric motor; a housing within which the electric motor is disposed; a battery bay configured to receive the battery when the battery is mounted to the fluid sprayer; and a shelter defining a battery chamber configured to contain the battery, the shelter fully covering a top side of the battery with the battery mounted to the fluid sprayer to protect the battery from falling spray fluid; wherein the battery chamber includes a lower opening oriented vertically downward, the lower opening disposed vertically below a bottom side of the battery with the battery mounted to the fluid sprayer; wherein the battery chamber includes an outer opening oriented longitudinally away from the housing, the outer opening spaced longitudinally outward from an outer side of the battery with the battery mounted to the fluid sprayer; and wherein the shelter is configured such that the shelter at least partially covers a first lateral side of the battery and a second lateral side of the battery with the battery mounted to the fluid sprayer, and the shelter is spaced from the battery with the battery mounted to the fluid sprayer such that air gaps are formed between the shelter and the first lateral side of the battery and between the shelter and the second lateral side of the battery.

20. The fluid sprayer of claim 19, wherein a ceiling of the shelter is disposed vertically above the battery, the ceiling at least partially defining the battery chamber, and an area of the ceiling defining

the battery chamber is greater than an area of the top side of the battery oriented towards the ceiling.

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