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# WATER INJECTION UNIT AND ENERGY STORAGE SYSTEM INCLUDING THE SAME


## Abstract

A water injection unit including an enclosure including a base frame and an enclosure body forming a side portion, a water tank supported on the base frame of the enclosure, a gas storage tank supported on the base frame of the enclosure and connected to the water tank to supply gas into the water tank, and a connection port, wherein the connection port comprises a water injection port connectable to a fire-fighting connection hose.



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## Background/Summary

CROSS REFERENCE TO RELATED APPLICATIONS [0001] The present application is a Continuation of application Ser. No. 18/755,427, filed on Jun. 26, 2024, which is a continuation of PCT/KR2023/000971, filed Jan. 19, 2023, and claims priority to Korean Patent Application Nos. 10-2022-0008104 and 10-2023-0006974, filed on Jan. 19, 2022, and Jan. 17, 2023, respectively, in the Republic of Korea, the disclosures of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to a water injection unit and an energy storage system including the same, and more particularly, to a water injection unit capable of supplying fire extinguishing water to a plurality of energy storage containers, and an energy storage system including the water injection unit.

BACKGROUND

[0003] In the field of power infrastructure, the concept of a smart grid has emerged as the future of power distribution. A smart grid aims to optimize operational efficiency by enabling seamless two-way communication between power suppliers and consumers, facilitating real-time monitoring and control of the grid through the integration of information and communication technology into existing power systems. This transition towards a smart grid is particularly pertinent in light of the recent proliferation of newer power technologies, such as electric vehicle charging systems and renewable energy sources. Real-time consumer power usage information provided by the smart grid can significantly enhance power utilization efficiency, ultimately reducing the need for excessive investments in power generation facilities and mitigating greenhouse gas emissions and other climate impacts. Consequently, smart grids have garnered heightened interest, spurred by the desire to modernize power grids and expand renewable energy sources, prompting robust research and development efforts in this field.

[0004] A key technology within the realm of smart grids revolves around the innovation of energy storage devices. These devices accumulate surplus power during off-peak periods and judiciously dispense stored electric energy during peak demand, thereby fostering load leveling and promoting the optimal use of power infrastructure.

[0005] Historically, energy storage predominantly relied on methods such as pumped-storage power generation, which converts nighttime surplus power into potential energy stored in water, or the use of chemical energy storage through the parallel or series configuration of lead-acid batteries. However, recent advancements in high-energy-density lithium-ion batteries have revolutionized the landscape, making it feasible to construct high-voltage, high-capacity energy storage systems using chemical energy storage methods.

[0006] One of the most pressing social concerns associated with energy storage devices pertains to fire safety. Given the extensive incorporation of numerous batteries in energy storage devices, there can exist a substantial risk of chain reactions and fire propagation in the event of a failure involving a single battery.
[0007] Contemporary energy storage systems often include a large number of battery containers to meet large charge and discharge capacity requirements. Within each battery container, multiple battery racks may be employed, each of which may house a plurality of battery modules.
[0008] Consequently, ensuring the fire safety of these energy storage systems necessitates the deployment of an efficient fluid injection system capable of swiftly and effectively performing fluid injections and fire suppression functions for the numerous batteries encompassed within such energy storage systems.

## DISCLOSURE

### Technical Problem

[0009] The present disclosure is designed to solve the problems of the related art, and therefore the present disclosure is directed to providing a water injection unit capable of effective water injection to battery containers and having excellent installation convenience, and an energy storage system including the water injection unit.
[0010] However, technical objectives to be achieved by the present disclosure are not limited thereto, and other unmentioned technical objectives will be apparent to one of ordinary skill in the art from the description of the present disclosure.

### Technical Solution

[0011] In one aspect of the present disclosure, there is provided a water injection unit including an enclosure including a first side wall having a connection port connectable to a fire-fighting connection hose, a water tank connected to the connection port and located in the enclosure, a gas storage tank connected to the water tank to supply gas into the water tank, and a controller connected to the connection port and the gas storage tank, and configured to detect whether a fire occurs in a battery container, and cause gas in the gas storage tank to enter into the water tank and allow a fire extinguishing agent in the water tank to be discharged due to gas pressure. The enclosure may include an enclosure body forming a side portion and a ceiling portion, and a base frame assembly located under the enclosure body and supporting the enclosure body, and configured to be transportable by an industrial truck.
[0012] The gas storage tank may contain nitrogen.
[0013] The enclosure may further include an external water source port provided on an outer wall configured to be connectable to an external water source, and the pipe member may further include an external water source connection line for connecting the external water source port to the water injection pipe line.
[0014] The water injection unit may further include a pipe member provided in the enclosure, wherein the pipe member includes a water injection pipe line for connecting the water tank to the injection port, a drain/fill pipe line for connecting the water tank to the drain/fill port, and a communication conduit line for connecting the controller to the communication port.
[0015] The enclosure may further include an external water source port provided on an outer wall to be connectable to an external water source (e.g., a fire hydrant or a fire engine), and the pipe member may further include an external water source connection line for connecting the external water source port to the water injection pipe line.
[0016] The water injection unit may further include an air conditioning device fixedly provided on an outer wall of the enclosure to adjust a temperature and humidity in the enclosure.
[0017] The water injection unit may further include a manual operation unit provided on an outer wall of the enclosure and connected to the gas storage tank to release gas stored in the gas storage tank.
[0018] The water injection unit may further include a horn or a warning light provided on an outer

wall of the enclosure, connected to the controller, and configured to emit an alarm sound or light in an event situation.

[0019] The base frame assembly may include an outer frame forming a quadrangular edge with four beams, and a bottom panel portion covering an inner area of the quadrangular edge of the outer frame, wherein the outer frame includes insertion holes in two beams that are parallel to each other.

[0020] The base frame assembly may include an outer frame forming a quadrangular edge with four beams extending in a first direction, a bottom panel portion covering an inner empty area of the outer frame, and anchors inserted into each of the four beams, and configured to change positions along an extending direction of the beams.

[0021] Each of at least two of the four beams may include an anchor insertion portion formed by a recessed side surface, wherein each anchor is inserted into the anchor insertion portion, and includes a beam support plate including a first part having a height corresponding to a height of an inner space of the anchor insertion portion and having an interference fit with the anchor insertion portion, and a second part protruding outward from the anchor insertion portion, and an anchor plate provided at a lower end of the second part.

[0022] In another aspect of the present disclosure, there is provided an energy storage system including the water injection unit and a plurality of battery containers, each battery container including a battery rack, a fire detector, and a fire-fighting pipe line, wherein the water injection unit and the plurality of battery containers are connected by a fire-fighting connection hose.

[0023] The battery container may further include a fire-fighting connector provided on an outer wall surface and connected to the fire-fighting pipe line, wherein the fire-fighting connector of a first battery container of the plurality of battery containers and the fire-fighting connector of a second battery container of the plurality of battery containers are connected by the fire-fighting connection hose.

[0024] The fire-fighting connector may include a first fire-fighting connector provided on the first battery container, and a second fire-fighting connector provided on the first battery container, wherein the fire-fighting pipe line includes a main pipe having a first end connected to the first fire-fighting connector and a second end connected to the second fire-fighting connector, a plurality of branch pipes branching from the main pipe, and a rack pipe connected to each of the plurality of branch pipes and fixedly provided on the battery rack, wherein the rack pipe includes injection nozzles respectively connected to battery modules provided in the battery rack.

[0025] Each of at least two of the four beams comprises a U-shaped channel, and each anchor is inserted into the U-shaped channel and can be fixed at any point along the U-shaped channel.

[0026] Each anchor has a beam support plate comprising a first part having a height corresponding to a height of the U-shaped channel, a second part protruding outward from the U-shaped channel and an anchor plate provided at a lower end of the second part.

[0027] In another aspect of the present disclosure, there is provided a water injection unit including an enclosure including an enclosure body forming a side portion and a ceiling portion, a first side wall having a connection port connectable to a fire-fighting connection hose and a base frame assembly located under the enclosure body and supporting the enclosure body, a water tank connected to the connection port and located in the enclosure, a nitrogen storage tank connected to the water tank to supply nitrogen gas into the water tank; and a controller connected to the connection port and the nitrogen storage tank, and configured to detect whether a fire occurs in a battery container, cause nitrogen gas in the nitrogen storage tank to enter into the water tank, and allow a fire extinguishing agent in the water tank to be discharged due to nitrogen gas pressure.

[0028] The connection port is provided at a lower end of the first side wall of the enclosure, the connection port including an injection port connected to the fire-fighting connection hose configured to be connected to the battery container, a drain/fill port for filling or draining the fire extinguishing agent in or from the water tank and a communication port for connecting a

communication cable to the controller.
[0029] The water injection unit may have a pipe member provided in the enclosure, wherein the pipe member may include a water injection pipe line for connecting the water tank to the injection port, a drain/fill pipe line for connecting the water tank to the drain/fill port; and a communication conduit line for connecting the controller to the communication port.
Advantageous Effects
[0030] According to an aspect of the present disclosure, there may be provided a water injection unit capable of effective water injection to a plurality of battery containers and having excellent installation convenience, and an energy storage system including the water injection unit.
[0031] In particular, because the water injection unit according to the present disclosure is capable of fire determination, warning, and rapid water injection to a plurality of battery containers, early fire suppression may be achieved and the spread of a fire may be prevented.
[0032] Also, because the water injection unit according to the present disclosure has excellent transportation and installation convenience, human and material costs required to build on-site facilities may be reduced.
[0033] The effects of the present disclosure are not limited to the effects mentioned above, and other effects not mentioned will be clearly understood by one of ordinary skill in the art from the detailed description of the present disclosure.

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## Description

DESCRIPTION OF DRAWINGS
[0034] FIG. **1** is a schematic perspective view illustrating a water injection unit, according to an embodiment of the present disclosure.
[0035] FIG. **2** is a partial exploded perspective view illustrating the water injection unit of FIG. **1**.
[0036] FIG. **3** is a perspective view illustrating a base frame assembly, according to an embodiment of the present disclosure.
[0037] FIG. **4** is a plan view illustrating a base frame assembly, according to an embodiment of the present disclosure.
[0038] FIG. **5** is a view illustrating an anchor unit separated from an outer frame of FIG. **3**.
[0039] FIG. **6** is a view illustrating an example where a water injection unit is fixed to the ground.
[0040] FIG. **7** is a view illustrating an example where a position of the anchor unit of FIG. **6** is changed.
[0041] FIG. **8** is a rear view illustrating a water injection unit, according to an embodiment of the present disclosure.
[0042] FIG. **9** is an enlarged view illustrating a connection port of a water injection unit, according to an embodiment of the present disclosure.
[0043] FIG. **10** is a front view illustrating a water injection unit, according to an embodiment of the present disclosure.
[0044] FIG. **11** is a side view illustrating a water injection unit, according to an embodiment of the present disclosure.
[0045] FIG. **12** is a cross-sectional view illustrating a water injection unit, according to an embodiment of the present disclosure.
[0046] FIG. **13** is a longitudinal sectional view illustrating a water injection unit, according to an embodiment of the present disclosure.
[0047] FIG. **14** is a view schematically illustrating a configuration of an energy storage system, according to an embodiment of the present disclosure.
[0048] FIG. **15** is a view schematically illustrating some elements of a water injection unit and a battery container, according to an embodiment of the present disclosure.

[0049] FIG. **16** is a view schematically illustrating battery racks and a fire extinguishing pipe line provided in a battery container, according to an embodiment of the present disclosure.
[0050] FIG. **17** is a view schematically illustrating a connection type between two battery containers, according to an embodiment of the present disclosure.
[0051] FIG. **18** is an enlarged view illustrating a fire-fighting connector of a battery container, according to an embodiment of the present disclosure.
[0052] FIG. **19** is a diagram schematically illustrating a controller.

BEST MODE

[0053] Prior to the description, it should be understood that the terms used in the specification and the appended claims should not be construed as limited to general and dictionary meanings, but interpreted based on the meanings and concepts corresponding to technical aspects of the present disclosure on the basis of the principle that the inventor is allowed to define terms appropriately for the best explanation.
[0054] In the case in which one part is said to be connected to another part throughout the specification, not only may the one part be directly connected to the other part, but also, the one part may be indirectly connected to the other part via a further part. In addition, when a part "includes" a certain element, the part may further include another element instead of excluding the other element, unless otherwise stated.
[0055] Now, preferred embodiments of the present disclosure will be described in detail with reference to the accompanying drawings such that the preferred embodiments of the present disclosure may be easily implemented by one of ordinary skill in the art to which the present disclosure pertains. While describing the preferred embodiments of the present disclosure, descriptions of related well-known technology or configurations that may blur the points of the present disclosure are omitted.
[0056] A water injection unit described below is fire-fighting equipment for preferably outdoor installation and is fire-fighting equipment for ensuring fire safety of an energy storage system. However, the water injection unit according to the present disclosure is not necessarily an item that should be used restrictively to construct an energy storage system. That is, the water injection unit may be used as fire-fighting equipment for a general building or a warehouse, as well as an energy storage system.
[0057] FIG. **1** is a schematic perspective view illustrating a water injection unit, according to an embodiment of the present disclosure. FIG. **2** is a partial exploded perspective view illustrating the water injection unit of FIG. **1**.
[0058] Referring to FIGS. **1** and **2**, a water injection unit **10** according to an embodiment of the present disclosure includes an enclosure **100** including, on at least one outer wall, a connection port **130** connectable to a fire-fighting connection hose or a communication cable connected from a battery container **20**, a water tank **200** in which a certain amount of fire extinguishing water is stored, a gas storage tank **300** in which gas is stored, and a controller **400**.
[0059] As shown in FIG. **19**, controller **400** includes a system **802** having a processor **804**, a system memory **806** and a system bus **808**. The processor **804** can be any of various commercially available computer processors, including without limitation an AMD® Athlon®, Duron® and Opteron® processors; ARM® application, embedded and secure processors; IBM® and Motorola® DragonBall® and PowerPC® processors; IBM and Sony® Cell processors; Intel® Celeron®, Core®, Core (2) Duo®, Itanium®, Pentium®, Xeon®, and XScale® processors; and similar processors. Dual microprocessors, multi-core processors, and other multi-processor architectures may also be employed as the processor **804**.
[0060] The system bus **808** provides an interface for system components including, but not limited to, the system memory **806** to the processor **804**. The system bus **808** can be any of several types of bus structure that may further interconnect to a memory bus (with or without a memory controller), a peripheral bus, and a local bus using any of a variety of commercially available bus architectures.

Interface adapters may connect to the system bus **808** via a slot architecture. Example slot architectures may include without limitation Accelerated Graphics Port (AGP), Card Bus, (Extended) Industry Standard Architecture ((E)ISA), Micro Channel Architecture (MCA), NuBus, Peripheral Component Interconnect (Extended) (PCI(X)), PCI Express, Personal Computer Memory Card International Association (PCMCIA), and the like.

[0061] The system memory **806** may include various types of computer-readable storage media in the form of one or more higher speed memory units, such as read-only memory (ROM), random-access memory (RAM), dynamic RAM (DRAM), Double-Data-Rate DRAM (DDRAM), synchronous DRAM (SDRAM), static RAM (SRAM), programmable ROM (PROM), erasable programmable ROM (EPROM), electrically erasable programmable ROM (EEPROM), flash memory (e.g., one or more flash arrays), polymer memory such as ferroelectric polymer memory, ovonic memory, phase change or ferroelectric memory, silicon-oxide-nitride-oxide-silicon (SONOS) memory, magnetic or optical cards, an array of devices such as Redundant Array of Independent Disks (RAID) drives, solid state memory devices (e.g., USB memory, solid state drives (SSD) and any other type of storage media suitable for storing information. In the illustrated embodiment shown in FIG. **19**, the system memory **806** can include non-volatile memory **810** and/or volatile memory **812**. A basic input/output system (BIOS) can be stored in the non-volatile memory **810**.

[0062] The computing system **802** may include various types of computer-readable storage media in the form of one or more lower speed memory units, including an internal (or external) hard disk drive (HDD) **814**, a magnetic floppy disk drive (FDD) **816** to read from or write to a removable magnetic disk **818**, and an optical disk drive **820** to read from or write to a removable optical disk **822** (e.g., a CD-ROM or DVD). The HDD **814**, FDD **816** and optical disk drive **820** can be connected to the system bus **808** by an HDD interface **824**, an FDD interface **826** and an optical drive interface **828**, respectively. The HDD interface **824** for external drive implementations can include at least one or both of Universal Serial Bus (USB) and IEEE 1394 interface technologies.

[0063] The drives and associated computer-readable media provide volatile and/or nonvolatile storage of data, data structures, computer-readable instructions, computer-executable instructions, and so forth. For example, a number of program modules can be stored in the drives and memory units **810**, **812**, including an operating system **830**, one or more application programs **832**, other program modules **834**, and program data **836**. In one embodiment, the one or more application programs **832**, other program modules **834**, and program data **836** can include, for example, the various applications and/or components of the battery systems **200**.

[0064] A user can enter commands and information into the computing system **802** through one or more wire/wireless input devices, for example, a keyboard **838** and a pointing device, such as a mouse **840**. Other input devices may include microphones, infra-red (IR) remote controls, radio-frequency (RF) remote controls, game pads, stylus pens, card readers, dongles, finger print readers, gloves, graphics tablets, joysticks, keyboards, retina readers, touch screens (e.g., capacitive, resistive, etc.), trackballs, trackpads, sensors, styluses, and the like. These and other input devices are often connected to the processor **804** through an input device interface **842** that is coupled to the system bus **808**, but can be connected by other interfaces such as a parallel port, IEEE 1394 serial port, a game port, a USB port, an IR interface, and so forth.

[0065] A monitor **844** or other type of display device is also connected to the system bus **808** via an interface, such as a video adaptor **846**. The monitor **844** may be internal or external to the computing system **802**. In addition to the monitor **844**, a computer typically includes other peripheral output devices, such as speakers, printers, and so forth.

[0066] The computing system **802** may operate in a networked environment using logical connections via wire and/or wireless communications to one or more remote computers, such as a remote computer **848**. The remote computer **848** can be a workstation, a server computer, a router, a personal computer, portable computer, microprocessor-based entertainment appliance, a peer

device or other common network node, and typically includes many or all of the elements described relative to the computing system **802**, although, for purposes of brevity, only a memory/storage device **850** is illustrated. The logical connections depicted include wire/wireless connectivity to a local area network (LAN) **852** and/or larger networks, for example, a wide area network (WAN) **854**. Such LAN and WAN networking environments are commonplace in offices and companies, and facilitate enterprise-wide computer networks, such as intranets, all of which may connect to a global communications network, for example, the Internet. A network is one or more of the LAN **852** and the WAN **854**.

[0067] When used in a LAN networking environment, the computing system **802** is connected to the LAN **852** through a wire and/or wireless communication network interface or adaptor **856**. The adaptor **856** can facilitate wire and/or wireless communications to the LAN **852**, which may also include a wireless access point disposed thereon for communicating with the wireless functionality of the adaptor **856**.

[0068] When used in a WAN networking environment, the computing system **802** can include a modem **858**, or is connected to a communications server on the WAN **854**, or has other means for establishing communications over the WAN **854**, such as by way of the Internet. The modem **858**, which can be internal or external and a wire and/or wireless device, connects to the system bus **808** via the input device interface **842**. In a networked environment, program modules depicted relative to the computing system **802**, or portions thereof, can be stored in the remote memory/storage device **850**. It will be appreciated that the network connections shown are exemplary and other means of establishing a communications link between the computers can be used.

[0069] The computing system **802** is operable to communicate with wired and wireless devices or entities using the IEEE 802 family of standards, such as wireless devices operatively disposed in wireless communication (e.g., IEEE 802.16 over-the-air modulation techniques). This includes at least Wi-Fi (or Wireless Fidelity), WiMax, and Bluetooth™ wireless technologies, among others. Thus, the communication can be a predefined structure as with a conventional network or simply an ad hoc communication between at least two devices. Wi-Fi networks use radio technologies called IEEE 802.11x (a, b, g, n, etc.) to provide secure, reliable, fast wireless connectivity. A Wi-Fi network can be used to connect computers to each other, to the Internet, and to wire networks (which use IEEE 802.3-related media and functions).

[0070] Various embodiments may be implemented using hardware elements, software elements, or a combination of both. Examples of hardware elements may include processors, microprocessors, circuits, circuit elements (e.g., transistors, resistors, capacitors, inductors, and so forth), integrated circuits, application specific integrated circuits (ASIC), programmable logic devices (PLD), digital signal processors (DSP), field programmable gate array (FPGA), logic gates, registers, semiconductor device, chips, microchips, chip sets, and so forth. Examples of software may include software components, programs, applications, computer programs, application programs, system programs, machine programs, operating system software, middleware, firmware, software modules, routines, subroutines, functions, methods, procedures, software interfaces, application program interfaces (API), instruction sets, computing code, computer code, code segments, computer code segments, words, values, symbols, or any combination thereof. Determining whether an embodiment is implemented using hardware elements and/or software elements may vary in accordance with any number of factors, such as desired computational rate, power levels, heat tolerances, processing cycle budget, input data rates, output data rates, memory resources, data bus speeds and other design or performance constraints.

[0071] As described below in detail, because the water tank **200**, the gas storage tank **300**, the controller **400**, and other pipe members are accommodated in the enclosure **100** and the enclosure **100** includes the connection port **130** on a side wall, the water injection unit **10** may be easily transported to a desired installation location and may be simply and easily connected to the battery container **20**.

[0072] Also, because the water injection unit **10** according to the present disclosure is configured to determine whether there is a fire in the battery container **20** by communicating with the battery container **20** and supply fire extinguishing water to the battery container **20** when a fire is detected, early fire suppression of the battery container **20** may be achieved and the spread of the fire may be prevented.

[0073] As a main element of the water injection unit **10**, the enclosure **100** may protect components such as the water tank **200**, the gas storage tank **300**, and the controller **400** from the outside, and may be configured to be easily transported and installed outdoors.

[0074] The enclosure **100** may be implemented in the form of a box that is easy to transport and has an inner space in which the water tank **200**, the gas storage tank **300**, the controller **400**, and other pipe members may be accommodated. In detail, as shown in FIG. **1**, the enclosure **100** includes an enclosure body **110** forming a side portion and a ceiling portion, and a base frame assembly **120** located under the enclosure body **110** and supporting the enclosure body **110**. The side portion refers to a portion surrounding front, rear, left, and right sides of the enclosure **100** excluding upper and lower sides of the enclosure **100**, and the ceiling portion refers to a portion covering the upper side of the enclosure **100**.

[0075] The enclosure body **110** includes an inner frame **111**, a front door **112**, a rear door **113**, a first inner cover **114**, a second inner cover **115**, a first side panel assembly **116**, a second side panel assembly **117**, and a top cover **118**, as shown in FIG. **2**.

[0076] The inner frame **111** has a substantially rectangular parallelepiped structure by combining various angles and panels. Also, the inner frame **111** may include one or more bars that are vertically or horizontally provided therein. The water tank **200**, the gas storage tank **300**, the controller **400**, and other pipe members may be fixed to the bars by using fixing means such as a bracket.

[0077] Open portions of the inner frame **111** of FIG. **2** may be covered by the front door **112**, the rear door **113**, the first inner cover **114**, the second inner cover **115**, the first side panel assembly **116**, and the second side panel assembly **117** as shown in FIG. **1**.

[0078] The front door **112**, the rear door **113**, the first inner cover **114**, the second inner cover **115**, the first side panel assembly **116**, the second side panel assembly **117**, and the top cover **118** may each include an insulator and thus have insulation and dustproof performance.

[0079] Referring to FIG. **3**, the base frame assembly **120** may include an outer frame **121** forming a quadrangular edge with four beams and a bottom panel portion **124** covering an inner empty area of the outer frame **121**, and may be configured to support an enclosure body **110** from the bottom.

[0080] Also, the base frame assembly **120** may be configured to be transportable by a transportation device such as a fork-lift. The fork lift may refer to a transport vehicle or a transport device including a post erected at the front of the vehicle and a fork that may be lifted along the post.

[0081] In detail, the outer frame **121** includes fork insertion holes **122** in two beams that are parallel to each other. The fork insertion holes **122** formed in the two beams may be formed so that side portions of the beams are penetrated in a front-back direction (±X direction). The fork of the fork-lift may be inserted into the fork insertion holes **122**, and the water injection unit **10** may be lifted and transported by the fork-lift.

[0082] In the water injection unit **10** according to the present disclosure, the gas storage tank **300** may be replaced through the front door **112** of the enclosure **100**, and fire extinguishing water of the water tank **200** may be drained or filled through a drain/fill port **132** as a connection port **130** described below. In this case, when the water injection unit **10** is transported, the water injection unit **10** may be transported as light as possible by not placing the gas storage tank **300** in the enclosure **100** and emptying the water tank **200**. After the enclosure **100** is installed at a desired location, the gas storage tank **300** may be inserted into the enclosure **100** through the front door **112** of the enclosure **100** and the water tank **200** may be filled with fire extinguishing water.

[0083] Also, the base frame assembly **120** includes anchor insertion portions **123** formed in at least two of the four beams of the outer frame **121**, and anchor units **125** inserted into the anchor insertion portions **123**.
[0084] Referring to FIGS. **3** to **5**, in the outer frame **121**, the anchor insertion portions **123** may be provided in two beams extending in the X-axis direction and parallel to each other. The anchor insertion portions **123** is formed by causing a side surface of the beam to be recessed inward from an outer side.
[0085] In more detail, referring mainly to FIG. **5**, the anchor insertion portion **123** includes a first plate P**1** and a second plate P**2** spaced apart from each other in a height direction (Z direction) of the base frame assembly **120** and facing each other, and a third plate P**3** having upper and lower ends perpendicularly connected to the first and second plates P**1**, P**2**. The third plate P**3** is located in an inner edge portion in a width direction (Y direction) of the first and second plates P**1**, P**2**. The anchor insertion portion **123** has an inner space surrounded by the first to third plates P**1**, P**2**, P**3**, which is open in a direction facing the third plate. Accordingly, the anchor unit **125** may be partially inserted into the inner space of the anchor insertion portion **123**.
[0086] The anchor unit **125** includes a beam support plate **126** including a first part **126***a* and a second part **126***b*, and an anchor plate **127** provided at a lower end of the second part **126***b*.
[0087] In the beam support plate **126**, the first part **126***a* may have a height corresponding to a height of the inner space of the anchor insertion portion **123** and may be forcibly fitted (interference fit) into the anchor insertion portion **123**. In the beam support plate **126**, the second part **126***b* may further protrude outward from the anchor insertion portion **123**.
[0088] A pair of beam support plates **126** may be provided, and the two beam support plates **126** may be spaced apart from each other by a certain interval in a horizontal direction. Although one pair of beam support plates **126** are provided in the present embodiment, one, or three or more beam support plates **126** may be provided.
[0089] The anchor plate **127** is provided at a lower end of the second part **126***b* of the beam support plate **126**. The anchor plate **127** is formed in a plate shape horizontal to the lower end of the second part **126***b* to be parallel to the ground. That is, the beam support plate **126** and the anchor plate **127** are provided to cross each other. The anchor plate **127** may include a fastening hole H for fixing the anchor plate **127** to the ground by using, for example, an anchor bolt B.
[0090] The anchor units **125** may be inserted into the at least two beams, and may be configured to be fixed to the ground by changing positions along an extending direction of the beams.
[0091] Referring back to FIGS. **3** to **5**, the inner space of the anchor insertion portion **123** into which the anchor unit **125** may be inserted extends long in the extending direction of the beam. In this case, a range in which the anchor unit **125** may be provided and the number of anchor units **125** that may be provided may be increased.
[0092] For example, the anchor units **125** may be provided on both edges of the beam of the base frame assembly **120** as shown in FIG. **6**, or may be provided at positions spaced apart by a certain interval from one end and the other end of the beam as shown in FIG. **7**. Although not shown, three or four anchor units **125** may be provided for each beam.
[0093] For example, a drilling operation is performed in advance to make a hole in the ground E on which the water injection unit **10** is to be installed. A position of the hole that is formed in advance and a position of the fastening hole H of the anchor plate **127** may not match due to a drilling operation error. In this case, because the water injection unit **10** according to the present disclosure may simply change an installation position of the anchor unit **125**, the positional error between the position of the hole of the ground E and the position of the fastening hole H of the anchor plate **127** may be coped with. Also, the anchor plate **127** may be easily moved to a better location by checking a state of the ground E of the installation location.
[0094] As such, because the water injection unit **10** according to the present disclosure includes the anchor unit **125** and the outer frame **121** including the anchor insertion portion **123**, on-site

installation may be easily performed even outdoors by adjusting a position of the anchor unit **125** according to a state of the ground and inserting the anchor plate **127** into the ground.
[0095] Referring to FIGS. **8** and **9**, the enclosure **100** includes a plurality of connection ports **130**.
[0096] The connection port **130** may be provided on at least one outer wall of the enclosure **100** to connect a fire-fighting connection hose or a communication/power cable connected from external equipment (e.g., the battery container **20** or an external water source) at the outside of the enclosure **100**.
[0097] The connection port **130** may include a water injection port **131**, the drain/fill port **132**, and a communication port **133**.
[0098] The water injection port **131** and the drain/fill port **132** may be provided under the rear door **113** of the enclosure **100**.
[0099] The water injection port **131** may be connected to the fire-fighting connection hose at the outside of the enclosure **100**, and may be connected to the water tank **200** in the enclosure **100**.
[0100] The drain/fill port **132** is the connection port **130** for draining fire extinguishing water in the water tank **200** to the outside of the enclosure **100** or filling fire extinguishing water into the water tank **200** from the outside of the enclosure **100**. The drain/fill port **132** is connected to the water tank **200** in the enclosure **100**. The drain/fill port **132** may be normally closed with a stopper or the like, and may be connected to a drain hose or a fill hose at the outside of the enclosure **100** when necessary.
[0101] The communication port **133** may be connected to the communication cable at the outside of the enclosure **100**, and may be connected to the controller **400** in the enclosure **100**. The communication cable may be connected to a control unit and/or a fire detector provided in the battery container **20**.
[0102] The water injection port **131**, the drain/fill port **132**, and the communication port **133** may be provided as one set under the rear door **113**. In this case, a wiring layout between the water injection unit **10** and the battery container **20** may be easily simplified.
[0103] Referring to FIGS. **10** to **13**, the water injection unit **10** according to an embodiment of the present disclosure may further include an external water source port **134**. The external water source port **134** may be provided on an outer wall of the enclosure **100** to be connectable to an external water source (e.g., a fire hydrant or a fire engine).
[0104] That is, the external water source port **134** is a port where, when there is a fire hydrant around a place where the water injection unit **10** is installed, a fire hose for connecting the fire hydrant to the external water source port **134** is connected to use the fire hydrant instead of the water tank **200**. Because the external water source port **134** is provided on the outer wall of the enclosure **100**, when a fire occurs, fire extinguishing water of the water tank **200** may be primarily used for the fire, and when a fire engine reaches the scene of the fire, a fire hose of the fire engine may be connected to the external water source port **134** and fire extinguishing water of the fire engine may be directly supplied to the battery container **20**.
[0105] Referring to FIGS. **12** and **13**, the water tank **200** is an element in which fire extinguishing water is stored, and for example, a fire extinguishing water storage capacity may be determined according to the size or the number of fire extinguishing means. For example, in the present embodiment, the water tank **200** has a fire extinguishing water storage capacity of about 900 L to about 1000 L to respond to a fire in three battery containers **20**.
[0106] The water tank **200** is connected to the water injection port **131** through a water injection pipe line **510** in the enclosure **100**. Also, the water tank **200** may further include a pressure sensor PG and a water level sensor WG for monitoring internal pressure and a water level. An auxiliary pipe SP and a valve for opening/closing the auxiliary pipe SP may be provided in the water tank **200** to adjust a water level or pressure.
[0107] In particular, the water tank **200** may be connected to the gas storage tank **300**. As shown in FIG. **12**, the water tank **200** and the gas storage tank **300** may be connected by a gas supply pipe

**310** through which gas moves.
[0108] A valve of the gas storage tank **300** is opened/closed by the controller **400** under certain conditions to supply gas to the water tank **200**. When gas is sprayed from the gas storage tank **300** to the water tank **200**, fire extinguishing water in the water tank **200** may be rapidly and strongly discharged to the outside of the water tank **200** due to pressure of the gas.
[0109] The gas may be nitrogen gas. Accordingly, the gas storage tank **300** may be a nitrogen tank. However, the gas storage tank **300** does not necessarily have to be a nitrogen tank. That is, any gas may be used as long as it may perform a function like nitrogen gas.
[0110] The gas storage tank **300** may include a tank body in which gas may be stored, a valve provided on a side of the tank body, and an actuator **320** for closing/opening the valve. The actuator **320** may be connected to the controller **400**, and may be configured to operate according to a control signal of the controller **400**. The actuator may be any suitable mechanical or electronic actuator.
[0111] For example, when the controller **400** detects a fire in the battery container **20**, the actuator may be operated by the controller **400** to open the valve of the gas storage tank **300** and spray gas into the water tank **200** through the gas supply pipe **310**. Then, fire extinguishing water in the fire extinguishing tank may be rapidly discharged along the water injection pipe line **510** under pressure of the gas.
[0112] The controller **400** is an element connected to the connection port **130** and the gas storage tank **300**, and configured to detect whether a fire occurs in the battery container **20**, and allow gas in the gas storage tank **300** to be sprayed into the water tank **200** and allow fire extinguishing water in the water tank **200** to be discharged due to gas pressure.
[0113] That is, the controller **400** may be configured to transmit data to the battery container **20** to determine a fire situation of the battery container **20**, and when certain conditions are satisfied, control the gas storage tank **300** to spray gas from the gas storage tank **300**. In addition, the controller **400** may be configured to operate a horn/warning light **800** to notify an emergency situation. The controller **400** may selectively include a processor, an application-specific integrated circuit (ASIC), a logic circuit, a register, a communication modem, a data processing unit, and the like known in the art.
[0114] Also, the water injection unit **10** according to an embodiment of the present disclosure includes pipe members **500** for connecting the connection port **130**, the external water source port **134**, and internal components, that is, the water tank **200**, the gas storage tank **300**, and the controller **400**, in the enclosure **100**.
[0115] Referring to FIGS. **12** and **13**, the pipe members **500** include the water injection pipe line **510** for connecting the water tank **200** to the water injection port **131**, a drain/fill pipe line **520** for connecting the water tank **200** to the drain/fill port **132**, and a communication conduit line **530** for connecting the controller **400** to the communication port **133**.
[0116] The water injection pipe line **510** may include at least one metal conduit, a flexible hose, a connection flange, and an opening/closing valve. The water injection pipe line **510** extends from an upper end of the water tank **200** to the water injection port **131** located on a rear outer wall of the enclosure **100** and functions as a passage through which fire extinguishing water may move from the water tank **200** to the water injection port **131**.
[0117] The drain/fill pipe line **520** may include at least one metal conduit, a flexible hose, and an opening/closing valve, may extend from a lower end of the water tank **200** to the drain/fill port **132** located on the rear outer wall of the enclosure **100**, and may be used as a movement path of fire extinguishing water when fire extinguishing water is drained from the water tank **200** or is filled in the water tank **200**.
[0118] The communication conduit line **530** may include a conduit formed of an insulating material and at least one communication cable or power cable inserted into the conduit. The communication conduit line **530** functions as a movement path of data or power required to operate an AC box, the

gas storage tank **300**, the water tank **200**, an air conditioning device **600**, a manual operation unit **700**, and the horn/warning light **800** as well as between the controller **400** and the communication port **133** in the enclosure **100**.

[0119] The water injection unit **10** according to the present disclosure further includes an external water source connection line **540** as the pipe member **500** as shown in FIG. **13**. The external water source connection line **540** includes a flexible hose and a metal conduit. The external water source connection line **540** that is the pipe member **500** for moving fire extinguishing water introduced into the external water source port **134** to the water injection port **131** connects the external water source port **134** to the water injection pipe line **510**. For example, the external water source connection line **540** and the water injection pipe line **510** may be connected by a T flange **511** or a T-type tee. According to this pipe configuration, an external water source such as a water hydrant or a fire engine may be connected to the external water source port **134** provided on an outer wall of the enclosure **100**, to draw fire extinguishing water from the external water source and supply the fire extinguishing water to a target object in which a fire occurs, that is, the battery container **20**, through the external water source connection line **540**, the water injection pipe line, the water injection port **131**, and a fire-fighting connection hose connected to the water injection port **131**.

[0120] In the water injection unit **10** according to the present disclosure, the water tank **200**, the gas storage tank **300**, the controller **400**, and the pipe member **500** are arranged in the enclosure **100** as shown in FIG. **12**, for miniaturization, light weight, and convenience of management.

[0121] That is, in FIG. **12**, the water tank **200** having a largest volume is located at a left corner of the enclosure **100**, the gas storage tank **300** and the controller **400** are located to face the front door **112**, and most of the pipe members **500** and manual switches for opening/closing the pipe members **500** are located to face the rear door **113**.

[0122] According to this configuration, most of internal components may be managed and maintained by opening the front door **112** or the rear door **113**. For example, the gas storage tank **300** may be replaced or the controller **400** may be managed by opening the front door **112**, and the pipe member **500** and the connection port **130** may be managed by opening the rear door **113**. As such, because the internal components in the enclosure **100** may be managed and maintained and space intensively arranged, the enclosure **100** may be as small and light as possible.

[0123] The water injection unit **10** according to an embodiment of the present disclosure may further include the air conditioning device **600**. The air conditioning device **600** is fixedly provided on an outer wall of the enclosure **100** to adjust a temperature and humidity in the enclosure **100**. An operation of the air conditioning device **600** may be controlled by the controller **400**. For example, when a temperature in the enclosure **100** decreases, the controller **400** activates a heating function of the air conditioning device **600**, and when a temperature in the enclosure **100** increases, the controller **400** activates a cooling function of the air conditioning device **600**. In this case, even when a temperature outside the enclosure **100** drops below zero, fire extinguishing water in the water tank **200** may be prevented from freezing, and a malfunction of electronic and electrical components may be prevented.

[0124] Also, the water injection unit **10** according to an embodiment of the present disclosure may further include the manual operation unit **700** (e.g., a manual pull station (MPS)). The manual operation unit **700** may be provided on an outer wall of the enclosure **100**, and may be connected to the gas storage tank **300** in the enclosure **100** to spray gas stored in the gas storage tank **300**. For example, the manual operation unit **700** may be provided in the form of a lever. When the lever is pulled, a mechanical or electrical signal may be directly transmitted to the actuator **320** of the gas storage tank **300**, or may be transmitted to the actuator of the gas storage tank **300** through the controller **400**, so that the valve of the gas storage tank **300** is opened to spray gas. In an emergency situation where a fire detector does not operate, in particular, fire extinguishing water may be rapidly injected by using the manual operation unit **710**.

[0125] Also, the water injection unit **10** according to an embodiment of the present disclosure may

include the horn/warning light **800** at an upper end of a front surface of the enclosure **100** as shown in FIGS. **10** and **13**, to audibly and visually notify an event situation. The horn/warning light **800** may be connected to the controller **400** and may be configured to emit an alarm sound or light when a fire occurs based on a control signal of the controller **400**.

[0126] FIG. **14** is a view schematically illustrating a configuration of an energy storage system, according to an embodiment of the present disclosure. FIG. **15** is a view schematically illustrating some elements of the water injection unit **10** and the battery container **20**, according to an embodiment of the present disclosure. FIG. **16** is a view schematically illustrating battery racks **20** and a fire-fighting pipe line **23** provided in the battery container **20**, according to an embodiment of the present disclosure. FIG. **17** is a view schematically illustrating a connection type between two battery containers **20**, according to an embodiment of the present disclosure. FIG. **18** is an enlarged view illustrating a portion of the battery container **20**, according to an embodiment of the present disclosure.

[0127] An energy storage system according to the present disclosure will be described with reference to FIGS. **14** to **18**.

[0128] The energy storage system according to an embodiment of the present disclosure includes the water injection unit **10** and a plurality of battery containers **20**A, **20**B, **20**C as shown in FIG. **14**.

[0129] The water injection unit **10** has already been described above, and thus, the battery container **20** will be mainly described.

[0130] The battery container **20** includes the battery rack **21** and a container housing. The battery rack **21** may have a structure in which a plurality of modules (not shown) are stacked. In each battery module, a plurality of battery cells (secondary batteries) may be accommodated in a module case. Each battery module may be accommodated in a rack case and may be stacked in at least one direction. For example, each battery module may be vertically stacked through the rack case.

[0131] A plurality of battery racks **21** may be included in the battery container **20**. The plurality of battery racks **21** may be arranged in at least one direction, for example, a horizontal direction. For example, in the battery container **20** according to the present disclosure, eight battery racks **21** may be accommodated in the container housing.

[0132] The container housing may have an inner empty space in which the battery rack **21** may be accommodated. For example, the container housing may include a metal material such as steel.

[0133] Although not shown for convenience of illustration, the battery containers **20** may be electrically connected to each other through connection between main bus bars of the battery containers **20**. For example, each of a left battery container **20** and a right battery container **20** may include a main bus bar. A main bus bar connector located on an upper right portion of the left battery container **20** and a main bus bar connector located on an upper left portion of the right battery container **20** may be connected to each other through a connection bus bar or a connection cable. In this case, the main bus bar of the left battery container **20** and the main bus bar of the right battery container **20** may be electrically connected to each other. Accordingly, the left battery container **20** and the right battery connector **20** may be configured so that charging/discharging power flows therebetween. In this case, battery modules included in the left battery container **20** and battery modules included in the right battery container **20** may be electrically connected to each other in parallel.

[0134] According to this embodiment, charging/discharging power connection between the plurality of battery containers **20** may be easily made by connecting only the main bus bar connectors provided in the plurality of battery containers **20**. Furthermore, in this embodiment, because the main bus bar connectors located in adjacent portions between the plurality of battery containers **20** need to be connected to each other, the connection may be easily achieved.

[0135] Referring to FIGS. **15** to **18**, the battery container **20** according to the present disclosure may be configured to receive fire extinguishing water from the water injection unit **10**.

[0136] For example, referring to FIG. **15**, the battery container **20** may include a fire detector **22**,

the fire-fighting pipe line, and a fire-fighting connector **24**. The fire detector **22** includes a gas sensor and/or a temperature sensor, and is configured to detect, when gas or flame is generated in the battery module, the gas or flame. The fire detector **22** and the water injection unit **10** are connected through the communication cable **40** or wirelessly, and operation information of the fire detector **22** is transmitted to the controller **400** of the water injection unit **10**. Then, gas of the gas storage tank **300** may be sprayed by the controller **400**, and fire extinguishing water in the water tank **200** may be rapidly supplied to the battery container **20** due to pressure of the sprayed gas.

[0137] As shown in FIGS. **15** and **16**, the fire-fighting connector **24** may be connected to the water injection port **131** of the water injection unit **10** through a fire-fighting connection hose **30**, and thus, the battery container **20** may receive fire extinguishing water from the water injection unit **10**. The fire extinguishing water supplied to the battery container **20** may be supplied to the battery rack **21** in the container housing.

[0138] In detail, the battery container **20** may include the fire-fighting pipe line **23** connected to the fire-fighting connector **24** so that fire extinguishing water flows through a specific path in the container housing. The fire-fighting pipe line **23** may include a main pipe **25**, a plurality of branch pipes **26**, and a rack pipe **27**.

[0139] The main pipe **25** may have one end connected to the fire-fighting connector **24** provided one side wall surface of the battery container in the battery container **20** and extending in an arrangement direction of the battery racks **21**, and the other end connected to the fire-fighting connector **24** provided on the other side wall surface of the battery container **20**. The fire-fighting connector **24** provided on the one side wall surface of the battery container **20** is referred to as a first fire-fighting connector **24**F, and the fire-fighting connector **24** provided on the other side wall surface of the battery container **20** is referred to as a second fire-fighting connector **24**R.

[0140] The branch pipe **26** may branch from the main pipe **25** and may be connected to the rack pipe **27**. The rack pipe **27** may include injection nozzles **28** respectively connected to battery modules (not shown) provided in the battery rack **21**, may be connected to each branch pipe **26**, and may be fixedly provided on the battery rack **21**. The injection nozzle **28** may be a glass bulb. In this case, when a fire occurs in a specific battery module, a glass bulb connected to the specific battery module may be damaged, and thus, fire extinguishing water may be supplied into the specific battery module.

[0141] Also, the energy storage system according to the present disclosure may be configured to supply fire extinguishing water to the plurality of battery containers **20** by using one water injection unit **10**. For example, referring to FIG. **17**, the fire-fighting connector **24** of any one battery container **20** and the fire-fighting connector **24** of another battery container **20** may be connected through the fire-fighting connection hose **30**. Accordingly, the main pipes **25** of the two battery containers **20**A, **20**B may be connected to each other.

[0142] In more detail, referring to FIGS. **14** to **18** together, fire extinguishing water may be supplied from the water injection unit **10** to the first fire-fighting connector **24**F of the first battery container **20**. The fire extinguishing water may be supplied to the first fire-fighting connector **24**F of the second battery container **20**B through the main pipe **25** and the second fire-fighting connector **24**R of the first battery container **20**A, and the fire-fighting connection hose **30**. Then, the fire extinguishing water may be supplied from the first fire-fighting connector **24**F of the second battery container **20**B to the main pipe **25** of the second battery container **20**B. Because the second fire-fighting connector **24**R of the second battery container **20**B and the first fire-fighting connector **24**F of the third battery container **20**C are also connected through the fire-fighting connection hose **30**, the fire extinguishing water may move from the main pipe **25** of the second battery container **20**B to the main pipe **25** of the third battery container **20**C. Accordingly, the fire extinguishing water supplied from the water injection unit **10** may flow through all of the fire-fighting pipe lines **23** of the three battery containers **20**A, **20**B, **20**C.

[0143] According to this simple configuration of the energy storage system according to the present

disclosure, a fire of several battery containers **20** may be coped with by using only one water injection unit **10**. Accordingly, the safety of the plurality of battery containers **20** against a fire may be improved and installation convenience for a safety improvement structure may also be improved.

[0144] The present disclosure has been described with reference to exemplary embodiments. Also, the above description is intended to illustrate and describe preferred embodiments, and the present disclosure may be used in various other combinations, modifications, and environments. That is, changes or modifications may be made within the scope of the present disclosure, within the scope equivalent to the present disclosure, or within the scope of skill or knowledge in the art. Accordingly, the detailed description of the present disclosure is not intended to limit the present disclosure to the above embodiments. Also, the appended claims should be construed as covering other embodiments as well.

## Claims

**1**. A water injection unit comprising: an enclosure including a base frame and an enclosure body forming a side portion; a water tank supported on the base frame of the enclosure; a gas storage tank supported on the base frame of the enclosure and connected to the water tank to supply gas into the water tank; and a connection port, wherein the connection port comprises a water injection port connectable to a fire-fighting connection hose.

**2**. The water injection unit according to claim 1, further comprising a water injection pipe line having a first end connected to the water injection port and a second end connected to the water tank.

**3**. The water injection unit according to claim 1, wherein the connection port further comprises a drain/fill port for filling or draining a fire extinguishing agent in or from the water tank.

**4**. The water injection unit according to claim 3, further comprising a drain/fill line having a first end connected to the drain/fill port and a second end connected to a bottom of the water tank.

**5**. The water injection unit according to claim 2, wherein the enclosure further comprises: an external water source port provided on the enclosure body and configured to be connectable to an external water source; and an external water source connection line for connecting the external water source port to the water tank.

**6**. The water injection unit according to claim 5, wherein the external water source connection line has a first end connected to the external water source port and a second end connected to the water injection pipe.

**7**. The water injection unit according to claim 1, wherein the enclosure further comprises: an external water source port provided on the enclosure body and configured to be connectable to an external water source; and an external water source connection line for connecting the external water source port to the water tank.

**8**. The water injection unit according to claim 1, further comprising a controller connected to the gas storage tank and the water tank and configured to detect whether a fire occurs in a battery container, and to cause gas in the gas storage tank to enter into the water tank and allow a fire extinguishing agent in the water tank to be discharged due to gas pressure.

**9**. The water injection unit according to claim 1, wherein the enclosure body comprises a front side wall, a rear side wall, a left side wall and a right side wall.

**10**. The water injection unit according to claim 1, wherein the gas storage tank contains nitrogen.

**11**. A water injection unit comprising: an enclosure including a base frame and an enclosure body forming a side portion; a water tank supported on the base frame of the enclosure; and a gas storage tank supported on the base frame of the enclosure and connected to the water tank to supply gas into the water tank, wherein the base frame comprises an outer frame forming a perimeter of the base frame, and wherein anchors are inserted onto the outer frame and configured to change

positions along the outer frame.

**12**. The water injection unit according to claim 11, wherein at least opposite sides of the base frame comprise an anchor insertion portion formed by a recessed side surface, and wherein each anchor is inserted into one of the anchor insertion portions.

**13**. The water injection unit according to claim 12, wherein each anchor insertion portion comprises: a first plate and a second plate spaced apart from each other in a height direction of the base frame; and a third plate connected to the first plate and the second plate.

**14**. The water injection unit according to claim 13, wherein each anchor comprises: a beam support plate fitting between the first plate and the second plate of the anchor insertion portion; and an anchor plate at a lower end of the beam support plate.

**15**. An energy storage system comprising: a water injector, the water injector comprising: an enclosure including a base frame and an enclosure body forming a side portion; a water tank supported on the base frame of the enclosure; a gas storage tank supported on the base frame of the enclosure and connected to the water tank to supply gas into the water tank; and a connection port, the connection port comprising a water injection port; at least one battery container, the at least one battery container comprising: a battery rack; a fire detector; and a fire-fighting pipe line; and a fire-fighting connection hose extending between the water injection port and the fire-fighting pipe line.

**16**. The energy storage system according to claim 15, wherein the water injector further comprises a controller connected to the gas storage tank and the water tank, and configured to detect whether a fire occurs in the at least one battery container, and to cause gas in the gas storage tank to enter into the water tank, and allow a fire extinguishing agent in the water tank to be discharged into the fire-fighting connection hose due to gas pressure.

**17**. The energy storage system according to claim 16, wherein the connection port further comprises a communication port connected to the controller, and wherein a communication cable extends from the communication port to the at least one battery container.

**18**. The energy storage system according to claim 15, wherein the plurality of battery containers includes a first battery container and a second battery container, wherein the fire-fighting connection hose is connected to a first end of the fire-fighting pipe line of the first battery container, and wherein a second end of the fire-fighting pipe line of the first battery container is connected to a first end of the fire-fighting pipe line of the second battery container.

**19**. The energy storage system according to claim 18, further comprising a fire-fighting connector at the second end of the fire-fighting pipe line of the first battery container.

**20**. The energy storage system according to claim 15, wherein the fire-fighting pipe line comprises: a main pipe having a first end connected to the first fire-fighting connector and a second end connected to the second fire-fighting connector; a plurality of branch pipes branching from the main pipe; and a rack pipe connected to each of the plurality of branch pipes and fixedly provided on the battery rack, and wherein the rack pipe comprises injection nozzles respectively connected to battery modules provided in the battery rack.