

FIRE EXTINGUISHING SYSTEM

BACKGROUND OF THE DISCLOSURE

Technical Field

[0001] The present disclosure relates to a fire extinguishing system, and especially relates to a fire extinguishing system for parking areas.

Description of Related Art

[0002] The sprinkler heads of general fire extinguishing facilities are arranged on the ceilings to sprinkle water from top to bottom to cool down when the temperature is too high. For example, in the event of a fire, water is sprinkled from top to bottom to extinguish the fire.

[0003] Electric vehicles are becoming more and more popular. The power source of the electric vehicle comes from the lithium battery array. However, since the lithium battery array is usually arranged in the chassis of the electric vehicle, when the electric vehicle parked in a parking area catches fire, the above-mentioned sprinkler heads of general fire extinguishing facilities arranged on the ceilings cannot directly extinguish or cool down the lithium battery array arranged in the chassis of the electric vehicle, which endangers the fire safety of the parking area.

SUMMARY OF THE INVENTION

[0004] To solve the above-mentioned problems, an object of the present disclosure is to provide a fire extinguishing system.

[0005] To achieve the object of the present disclosure mentioned above, the fire extinguishing system of the present disclosure is applied to a parking area and a vehicle. The parking area includes a parking surface. The vehicle is parked on the parking surface. There is a space between the vehicle and the parking surface. The fire extinguishing system includes a control unit, a fluid unit, and a sensing unit. The fluid unit is electrically connected to the control unit. The sensing unit is electrically connected to the control unit. Moreover, the fluid unit includes a spray head. The spray head includes a body. The body includes a first water outlet and a second water outlet. The sensing unit senses an ambient temperature of the parking area to generate a temperature information and

transmits the temperature information to the control unit. When the temperature information is greater than or equal to a first threshold temperature value, the control unit controls the fluid unit to output a fluid to the space and the vehicle through the first water outlet and the second water outlet.

[0006] The advantage of the present disclosure is to improve the fire safety of the parking area.

[0007] Please refer to the detailed descriptions and figures of the present disclosure mentioned below for further understanding technologies, methods, and effects and achieving the predetermined purposes of the present disclosure. Further, the purposes, characteristics, and features of the present disclosure may be more deeply and specifically understood. However, the drawings are provided only for references and descriptions and not intended to limit the scope of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Fig. 1 shows a block diagram of the first embodiment of the fire extinguishing system of the present disclosure.

[0009] Fig. 2 shows a block diagram of the second embodiment of the fire extinguishing system of the present disclosure.

[0010] Fig. 3 and Fig. 4 show schematic diagrams of the first arrangement of the present disclosure.

[0011] Fig. 5 shows a block diagram of the third embodiment of the fire extinguishing system of the present disclosure.

[0012] Fig. 6 shows a schematic diagram of the second arrangement of the present disclosure.

[0013] Fig. 7 shows a three-dimensional view of the appearance of the spray head of the present disclosure.

[0014] Fig. 8 shows a side view of the spray head of the present disclosure.

[0015] Fig. 9 shows a cross-sectional view of the spray head of the present disclosure.

[0016] Fig. 10 shows a three-dimensional view of the appearance of the spray head of the present disclosure from another angle.

DETAILED DESCRIPTION

[0017] In the present disclosure, numerous specific details are provided, to provide a comprehensive understanding of embodiments of the present disclosure. However, those skilled in the art may understand that the present disclosure may be practiced without one or more of these specific details. In other instances, well-known details are not shown or described to avoid obscuring features of the present disclosure. The technical content and the detailed description of the present disclosure are as follows with reference to the figures.

[0018] Fig. 1 shows a block diagram of the first embodiment of the fire extinguishing system 1 of the present disclosure. The fire extinguishing system 1 includes a fluid unit 10, a sensing unit 20, and a control unit 30. The sensing unit 20 includes a temperature sensor 22. The components mentioned above are electrically connected to each other. The fire extinguishing system 1 is applied to a parking area 100 and a vehicle 200. The fluid unit 10 includes a pipeline 11 carrying a fluid 12, so that the fluid 12 may flow in the pipeline 11 and be transported to a location or an area where the fluid 12 needs to be used for fire extinguishing purposes, such as the lower part of the parking area 100 corresponding to the bottom of the vehicle 200.

[0019] The sensing unit 20 senses an ambient temperature of the parking area 100 to generate a temperature information 21 and transmits the temperature information 21 to the control unit 30. When the temperature information 21 is greater than or equal to a first threshold temperature value, the control unit 30 controls the fluid unit 10 to output the fluid 12 to the parking area 100 and the vehicle 200, and at this time the control unit 30 outputs a warning message 31. The fluid 12 may be water, potassium carbonate, liquid carbon dioxide, chemical foam fire extinguishing agent, hydrofluorocarbon (HFC), haloalkane (Halon), 3M's Novec fire extinguishing agent, and so on.

[0020] The pipe 11 may be made of polyvinylchloride (usually abbreviated to PVC), galvanized metal (also called electrical metallic tubing, usually abbreviated to EMT), chlorinated polyvinyl chloride (usually abbreviated to CPVC), galvanized steel (also called rigid steel galvanized, usually abbreviated to RSG), cast iron pipe, steel pipe, stainless steel

pipe, copper pipe, brass pipe, bronze pipe, and so on. The installation method of the pipeline 11 may be the exposed pipe method or the concealed pipe method. The installation method of the pipeline 11 includes the tree piping, the looped piping, the gridded piping, and so on.

[0021] Fig. 2 shows a block diagram of the second embodiment of the fire extinguishing system 1 of the present disclosure. The descriptions of the elements shown in Fig. 2 which are the same as the elements shown in Fig. 1 are not repeated here for brevity. The fire extinguishing system 1 is further applied to a cloud server 40. The fluid unit 10 further includes a spray head 13 and a solenoid valve 14. The spray head 13 and the pipeline 11 are connected to each other. The spray head 13 is used to output the fluid 12 flowing in the pipeline 11. The solenoid valve 14 is electrically connected to the control unit 30. The control unit 30 includes a communication component 32. The temperature sensor 22 includes a first temperature sensor 201 and a second temperature sensor 202. The first temperature sensor 201 and the second temperature sensor 202 are electrically connected to the control unit 30. The communication component 32 transmits the temperature information 21 to the cloud server 40. The warning message 31 outputted by the control unit 30 is transmitted to the cloud server 40 by the communication component 32.

[0022] The first temperature sensor 201 senses the ambient temperature of the parking area 100. The first temperature sensor 201 generates the temperature information 21 and transmits the temperature information 21 to the control unit 30 when the ambient temperature of the parking area 100 is higher than a first temperature. The second temperature sensor 202 senses the ambient temperature of the parking area 100. The second temperature sensor 202 generates the temperature information 21 and transmits the temperature information 21 to the control unit 30 when the ambient temperature of the parking area 100 is higher than a second temperature. Moreover, the second temperature is higher than the first temperature. The advantage of the present disclosure using two temperature sensors (namely, the first temperature sensor 201 and the second temperature sensor 202) is that when one of the first temperature sensor 201

and the second temperature sensor 202 fails, the present disclosure still has the other of the first temperature sensor 201 and the second temperature sensor 202 operating, thus improving the safety and the reliability of the overall system.

[0023] Fig. 3 and Fig. 4 show schematic diagrams of the first arrangement of the present disclosure. The descriptions of the elements shown in Fig. 3 and Fig. 4 which are the same as the elements shown in Fig. 2 are not repeated here for brevity. Please refer to Fig. 2 at the same time. The fluid unit 10 is arranged at the lower part of the parking area 100. In other words, the spray head 13 faces the lower part of the parking area 100. The parking area 100 includes a parking surface 101. The vehicle 200 is parked on the parking surface 101. There is a space 103 between the vehicle 200 and the parking surface 101. The fluid unit 10 on the parking surface 101 is L-shaped. The spray head 13 is arranged in the middle gap between a pair of wheel stops 102 on the parking surface 101 to evenly output the fluid 12 to the parking surface 101 and the vehicle 200.

[0024] When the temperature information 21 is greater than (or equal to) a second threshold temperature value and less than the first threshold temperature value, the control unit 30 outputs the warning message 31, and at this time the fluid unit 10 may not need to output the fluid 12 to the space 103 and the vehicle 200. However, when the temperature information 21 is greater than or equal to the first threshold temperature value, the control unit 30 not only outputs the warning message 31, but at this time the control unit 30 also controls the fluid unit 10 to output the fluid 12 to the space 103 and the vehicle 200. Moreover, the first threshold temperature value is greater than the second threshold temperature value.

[0025] The control unit 30 controls a plurality of the solenoid valves 14 to open or close. When the pipeline 11 is applied to a plurality of the parking areas 100, the control unit 30 may control the opening and the closing of the solenoid valves 14 through a plurality of the temperature information 21 of the parking areas 100 provided by a plurality of the sensing units 20, thereby controlling whether each of a plurality of the spray heads 13 outputs the fluid 12 for fire extinguishing or cooling.

[0026] Fig. 5 shows a block diagram of the third embodiment of the fire extinguishing system 1 of the present disclosure. The descriptions of the elements shown in Fig. 5 which are the same as the elements shown in Fig. 2 are not repeated here for brevity. The fire extinguishing system 1 further includes a water mist unit 50 electrically connected to the control unit 30. The control unit 30 further includes a warning light 33, a speaker 34, and a control interface 35. When the control unit 30 outputs the warning message 31, the warning light 33 generates a warning light effect and the speaker 34 generates a warning sound to inform people near the parking area 100 of the emergency. The control interface 35 is used for the user to manually control the fluid unit 10 and the sensing unit 20.

[0027] Fig. 6 shows a schematic diagram of the second arrangement of the present disclosure. The descriptions of the elements shown in Fig. 6 which are the same as the elements shown in Fig. 5 are not repeated here for brevity. The water mist unit 50 is arranged above the vehicle 200 and the parking surface 101, namely, the upper part of the parking area 100 (for example, on the ceiling).

[0028] Fig. 7 shows a three-dimensional view of the appearance of the spray head 13 of the present disclosure. Fig. 8 shows a side view of the spray head 13 of the present disclosure. Fig. 9 shows a cross-sectional view of the spray head 13 of the present disclosure. Fig. 10 shows a three-dimensional view of the appearance of the spray head 13 of the present disclosure from another angle. Please refer to Fig. 2, Fig. 3, and Fig. 7-10 at the same time.

[0029] The spray head 13 includes a body 133 and a connecting body 139. The connecting body 139 is connected to the body 133. The body 133 includes a first water outlet 131 and a plurality of second water outlets 132. A plurality of bevel angles of the second water outlets 132 are different from each other. The second water outlets 132 include a first water sub-outlet 136, a second water sub-outlet 137, and a third water sub-outlet 138. The first water sub-outlet 136, the second water sub-outlet 137, and the third water sub-outlet 138 are located on one side of the first water outlet 131. Moreover, the first water outlet 131 and the second water outlets 132 (including the first water sub-outlet

136, the second water sub-outlet 137, and the third water sub-outlet 138) are grooved or porous water outlets (which may make the water outputted be in the form of fine mist).

[0030] The body 133 includes a cone portion 134 and a cylindrical portion 135 connected to each other. The cone portion 134 includes a top plane 1341. The cylindrical portion 135 includes a bottom plane 1351. The first water outlet 131 is arranged in a center of the body 133, and between the top plane 1341 and the bottom plane 1351. The first water sub-outlet 136 is obliquely arranged from the cone portion 134 to the cylindrical portion 135. The second water sub-outlet 137 and the third water sub-outlet 138 are obliquely arranged in the cylindrical portion 135.

[0031] When the temperature information 21 is greater than or equal to the first threshold temperature value, the control unit 30 controls the fluid unit 10 to output the fluid 12 to the space 103 and the vehicle 200 through the first water outlet 131, the first water sub-outlet 136, the second water sub-outlet 137, and the third water sub-outlet 138.

[0032] Moreover, the fluid unit 10 may be arranged near the front of the vehicle 200 as shown in Fig. 3, or the fluid unit 10 may be arranged near the rear of the vehicle 200 as shown in Fig. 6. The first threshold temperature value and the second threshold temperature value are stored in the control unit 30 in advance.

[0033] The advantage of the present disclosure is to improve the fire safety of the parking area 100. Especially if the vehicle 200 is an electric vehicle with a lithium battery array arranged on the chassis, the advantage of the present disclosure will be even more significant.

[0034] Although the present disclosure has been described with reference to the embodiment thereof, it will be understood that the present disclosure is not limited to the details thereof. Various substitutions and modifications have been suggested in the foregoing description, and others will occur to those of ordinary skill in the art. Therefore, all such substitutions and modifications are intended to be embraced within the scope of the present disclosure.

CLAIMS

1. A fire extinguishing system (1) applied to a parking area (100) and a vehicle (200), the parking area (100) comprising a parking surface (101), the vehicle (200) being parked on the parking surface (101), there being a space (103) between the vehicle (200) and the parking surface (101), the fire extinguishing system (1) comprising:

a control unit (30);

a fluid unit (10) electrically connected to the control unit (30); and

a sensing unit (20) electrically connected to the control unit (30),

wherein the fluid unit (10) comprises a spray head (13); the spray head (13) comprises a body (133); the body (133) comprises a first water outlet (131) and a second water outlet (132); the sensing unit (20) senses an ambient temperature of the parking area (100) to generate a temperature information (21) and transmits the temperature information (21) to the control unit (30); when the temperature information (21) is greater than or equal to a first threshold temperature value, the control unit (30) controls the fluid unit (10) to output a fluid (12) to the space (103) and the vehicle (200) through the first water outlet (131) and the second water outlet (132).

2. The fire extinguishing system (1) of the claim 1, wherein the body (133) comprises a plurality of the second water outlets (132); a plurality of bevel angles of the second water outlets (132) are different from each other; the second water outlets (132) comprise a first water sub-outlet (136), a second water sub-outlet (137), and a third water sub-outlet (138); the first water sub-outlet (136), the second water sub-outlet (137), and the third water sub-outlet (138) are located on one side of the first water outlet (131).

3. The fire extinguishing system (1) of the claim 2, wherein the body (133) comprises a cone portion (134) and a cylindrical portion (135) connected to each other; the cone portion (134) comprises a top plane (1341); the cylindrical portion (135) comprises a bottom plane (1351); the first water outlet (131) is arranged in a center of the body (133), and between the top plane (1341) and the bottom plane (1351).

4. The fire extinguishing system (1) of the claim 3, wherein the first water sub-outlet (136) is obliquely arranged from the cone portion (134) to the cylindrical portion (135); the second water sub-outlet (137) and the third water sub-outlet (138) are obliquely arranged in the cylindrical portion (135).

5. The fire extinguishing system (1) of the claim 4, wherein the spray head (13) further comprises a connecting body (139); the connecting body (139) is connected to the body (133).

6. The fire extinguishing system (1) of the claim 1, wherein the fluid unit (10) on the parking surface (101) is L-shaped.

7. The fire extinguishing system (1) of the claim 1, wherein when the temperature information (21) is greater than or equal to a second threshold temperature value, the control unit (30) outputs a warning message (31); the first threshold temperature value is greater than the second threshold temperature value.

8. The fire extinguishing system (1) of the claim 1, wherein the fluid unit (10) further comprises a solenoid valve (14) electrically connected to the control unit (30); the sensing unit (20) comprises a temperature sensor (22) electrically connected to the control unit (30); the temperature sensor (22) comprises a first temperature sensor (201) and a second temperature sensor (202); the first temperature sensor (201) and the second temperature sensor (202) are electrically connected to the control unit (30); the first temperature sensor (201) senses the ambient temperature of the parking area (100); the first temperature sensor (201) generates the temperature information (21) and transmits the temperature information (21) to the control unit (30) when the ambient temperature of the parking area (100) is higher than a first temperature; the second temperature sensor (202) senses the ambient temperature of the parking area (100); the second temperature sensor (202) generates the temperature information (21) and transmits the temperature information (21) to the control unit (30) when the ambient temperature of the parking area (100) is higher than a second temperature; the second temperature is higher than the first temperature.

9. The fire extinguishing system (1) of the claim 1, further applied to a cloud server (40), wherein the control unit (30) comprises a communication component (32); the communication component (32) transmits the temperature information (21) to the cloud server (40).

10. The fire extinguishing system (1) of the claim 1, further comprising:
a water mist unit (50) electrically connected to the control unit (30).