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# (54) LIQUID-COOLED INTELLIGENT ALCOHOL FIREPLACE

(57) The present disclosure provides a liquid-cooled intelligent alcohol fireplace. The liquid-cooled intelligent alcohol fireplace comprises a fireplace body consisting of a shell, an alcohol storage box, a combustion groove and a faceplate, an alcohol supplying assembly, a liquid cooling assembly and a circuit assembly; the alcohol supplying assembly comprises an alcohol container, alcohol supply pipes, an alcohol inlet, an alcohol self-priming pump, a submersible pump and an alcohol discharge head; the liquid cooling assembly comprises a first cooling pipe, a second cooling pipe, a first cooling self-priming pump, a second cooling self-priming pump, cooling liquid flowing pipes and a cooling liquid container; and the circuit assembly comprises a start switch, an ignition switch, a main control board, an ignition needle, a temperature sensor, a first liquid level sensor, a second liquid level sensor and a third liquid level sensor. The liquid-cooled intelligent alcohol fireplace of the present disclosure can automatically pump alcohol, automatically control the liquid level of alcohol in the combustion groove and automatically control the temperature of the combustion groove in use so as to correspondingly control the size of alcohol flame, which is convenient and safe in use, saves energy and protects the environment.

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## Description

### TECHNICAL FIELD

**[0001]** The present disclosure relates to fireplaces, and specifically relates to a liquid-cooled intelligent alcohol fireplace.

### BACKGROUND

**[0002]** A fireplace is originated in western countries and has practicability and ornamental features. With the continuous improvement of living standards and life taste of people, the fireplace is gradually applied to the domestic home decoration. The traditional fireplace takes woods as fuel, and recently it is gradually replaced by a cleaner and more environmentally friendly alcohol fireplace using alcohol as the fuel. A common alcohol fireplace only is a device formed by simply welding metal materials, ignition and alcohol addition are operated manually so as to be inconvenient and unsafe, and the temperature of a fireplace body and the size of flame are hard to be controlled in the alcohol combusting process, so the alcohol fuel is easy to be wasted.

### SUMMARY

**[0003]** An objective of the present disclosure is to provide a liquid-cooled intelligent alcohol fireplace, which has relatively high automatization degree and relatively great safety in use and can effectively control the temperature of the fireplace and the size of flame, by aiming at problems in the prior art.

**[0004]** A technical scheme of the present disclosure is: the liquid-cooled intelligent alcohol fireplace comprises a fireplace body, the fireplace body comprises a shell, an alcohol storage box, a combustion groove and a faceplate; and its structure is characterized by further comprising an alcohol supplying assembly, a liquid cooling assembly and a circuit assembly;

the alcohol supplying assembly comprises an alcohol container, alcohol supply pipes, an alcohol inlet, an alcohol self-priming pump, a submersible pump and an alcohol discharge head; the alcohol container and the fireplace body are separately arranged; the alcohol inlet is fixedly formed in the faceplate, and the alcohol self-priming pump and the submersible pump are fixedly mounted in the shell; the alcohol discharge head is fixedly arranged on the combustion groove; whereby, the alcohol container, the alcohol inlet, the alcohol self-priming pump, the alcohol storage box, the submersible pump, the alcohol discharge head and the alcohol supply connecting pipe form alcohol conveying channels; the liquid cooling assembly comprises a first cooling pipe, a second cooling pipe, a first cooling self-priming pump, a second cooling self-priming pump, cooling liquid flowing pipes and a cooling liquid container; the first cooling pipe and the second cooling pipe are fixedly arranged in the lower portion of the combustion groove; the first cooling pipe, the first cooling self-priming pump, the cooling liquid container and the cooling liquid flowing connecting pipes form a first liquid cooling channel; the second cooling pipe, the second cooling self-priming pump, the liquid container and the cooling liquid flowing connecting pipes form a second liquid cooling channel; and the circuit assembly comprises a start switch, an ignition switch, a main control board, an ignition needle, a temperature sensor, a first liquid level sensor, a second liquid level sensor and a third liquid level sensor; the start switch and the ignition switch are fixedly arranged on the faceplate; the main control board is fixedly arranged in the shell; the ignition needle is fixedly arranged on the combustion groove and is located by the side of the alcohol discharge head; the temperature sensor, the first liquid level sensor, the second liquid level sensor and the third liquid level sensor are fixedly arranged on the combustion groove; and the start switch, the ignition switch, the ignition needle, the temperature sensor, the first liquid level sensor, the second liquid level sensor, the third liquid level sensor, the alcohol self-priming pump, the submersible pump, the first cooling self-priming pump and the second cooling self-priming pump are electrically connected to the main control board.

**[0005]** A further scheme is: the circuit assembly further comprises a loudspeaker electrically connected to the main control board.

**[0006]** A further scheme is: a thermal insulator is arranged between the faceplate of the fireplace body and the combustion groove.

**[0007]** A further scheme is: the thermal insulator arranged between the faceplate of the fireplace body and the combustion groove is made of bakelite.

**[0008]** A further scheme is: heat dissipation holes are formed in the shell.

**[0009]** A further scheme is: the material of the combustion groove is aluminum alloy.

**[0010]** The present disclosure has positive effects: (1) the liquid-cooled intelligent alcohol fireplace of the present disclosure can automatically add alcohol, automatically control the liquid level of the alcohol in the combustion groove and automatically control the temperature of the combustion groove in use by utilizing a structure design, in which the alcohol supplying assembly, the liquid cooling assembly and the circuit assembly match with the fireplace body, so as to correspondingly control the size of alcohol flame, which is convenient and safe in use, saves energy and protects the environment; and (2) the liquid-cooled intelligent alcohol fireplace of the present disclosure can largely reduce the temperature of the faceplate in use to prevent the faceplate from turning black, deforming and aging by arranging the thermal insulator between the faceplate of the fireplace body and the combustion groove, so as to prolong the service life.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0011]**

FIG. 1 is a schematic structural diagram of a fireplace body in the present disclosure;
FIG. 2 is a top view of FIG. 1;
FIG. 3 is a schematic diagram of a stereo structure of the fireplace body in the present disclosure;
FIG. 4 is a schematic structural diagram of the present disclosure and shows the fireplace body by utilizing a split structure;
FIG. 5 is a schematic structural diagram of a combustion groove in FIG. 4 and also shows mounting relationships of the combustion groove and associated components; and
FIG. 6 is a schematic diagram of a circuit structure of the present disclosure.

**[0012]** Reference signs in the drawings are as follows:

1, fireplace body; 11, shell; 11-1, shell body; 11-2 cover plate; 11-1-1, heat dissipation hole; 12, alcohol storage box; 13, combustion groove; 14, faceplate; and 15, thermal insulator;
2, alcohol supplying assembly; 21, alcohol container; 22, alcohol supply pipe; 23, alcohol inlet; 24, alcohol self-priming pump; 25, submersible pump; and 26, alcohol discharge head;
3, liquid cooling assembly; 31, first cooling pipe; 32, second cooling pipe; 33 first cooling self-priming pump; 34, second cooling self-priming pump; 35, cooling liquid flowing pipe; and 36, cooling liquid container; and
4, circuit assembly; 41, start switch; 42, ignition switch; 43, main control board; 44, ignition needle; 45, temperature sensor; 46, first liquid level sensor; 47, second liquid level sensor; 48, third liquid level sensor; and 49, loudspeaker.

## DESCRIPTION OF THE EMBODIMENTS

**[0013]** The present disclosure will be further described in detail with reference to the accompanying drawings and specific embodiments.

Embodiments

**[0014]** As shown in FIG. 1 to FIG. 6, a liquid-cooled intelligent alcohol fireplace of the embodiment is mainly composed of a fireplace body 1, an alcohol supplying assembly 2, a liquid cooling assembly 3 and a circuit assembly 4.

**[0015]** The fireplace body 1 is mainly composed of a shell 11, an alcohol storage box 12, a combustion groove 13 and a faceplate 14; the shell 11 is mainly composed of a shell body 11-1 having U-shaped end faces and two end cover plates 11-2 arranged at the two ends of the shell body 11-1, and the shell 11 is provided with a plurality of heat dissipation holes 11-1-1; the alcohol storage box 12 is fixedly mounted in the shell body 11-1; the combustion groove 13 is fixedly mounted in the shell body 11-1 and is located above the alcohol storage box 12, wherein the material of the combustion groove 13 in the embodiment preferably utilizes aluminum alloy to easy dissipate heat; the faceplate 14 is fixedly mounted at the upper end of the shell 11; a thermal insulator 15 is arranged between the faceplate 14 and the combustion groove 13; and the material of the thermal insulator 15 in the embodiment preferably utilizes bakelite, the chemical name of the bakelite is phenolic plastic, and the bakelite has relatively higher mechanical strength, excellent insulation, thermal resistance and corrosion resistance. The thermal insulator 15 is arranged between the faceplate 14 and the combustion groove 13 such that the temperature of the faceplate can be largely reduced in use.

**[0016]** The alcohol supplying assembly 2 is mainly composed of an alcohol container 21, alcohol supply pipes 22, an alcohol inlet 23, an alcohol self-priming pump 24, a submersible pump 25 and an alcohol discharge head 26.

**[0017]** The alcohol container 21 and the fireplace body 1 are separately arranged; the alcohol inlet 23 is fixedly formed in the faceplate 14 of the fireplace body 1, and the alcohol self-priming pump 24 and the submersible pump 25 are fixedly mounted in the shell 11; the alcohol discharge head 26 is fixedly arranged on the combustion groove 13 of the fireplace body 1; therefore, in use, the alcohol container 21, the alcohol inlet 23, the alcohol self-priming pump 24, the alcohol storage box 12, the submersible pump 25, the alcohol discharge head 26 and the alcohol supply pipes 22 for connecting all components form alcohol conveying channels.

**[0018]** The liquid cooling assembly 3 is mainly composed of a first cooling pipe 31, a second cooling pipe 32, a first cooling self-priming pump 33, a second cooling self-priming pump 34, cooling liquid flowing pipes 35 and a cooling liquid container 36.

**[0019]** The first cooling pipe 31 and the second cooling pipe 32 are fixedly arranged in the lower portion of the combustion groove 13; the first cooling pipe 31, the first cooling self-priming pump 33, the cooling liquid container 36 and the cooling liquid flowing pipes 35 for connecting all components form a first liquid cooling channel; the second cooling pipe 32, the second cooling self-priming pump 34, the liquid container 36 and the cooling liquid flowing pipes 35 for connecting all components form a second liquid cooling channel; in use, when the combustion groove 13 needs to cool down, liquid coolant flowing in the first cooling pipe 31 and the second cooling pipe 32 bring the heat away to achieve an objective of cooling.

**[0020]** The circuit assembly 4 is mainly composed of a start switch 41, an ignition switch 42, a main control board 43, an ignition needle 44, a temperature sensor 45, a first liquid level sensor 46, a second liquid level

sensor 47, a third liquid level sensor 48 and a loudspeaker 49.

**[0021]** The start switch 41 and the ignition switch 42 are fixedly arranged on the faceplate 14 of the fireplace body 1; the main control board 43 and the loudspeaker 49 are fixedly arranged in the shell 11; the ignition needle 44 is fixedly arranged on the combustion groove 13 and is located by the side of the alcohol discharge head 26; and the temperature sensor 45, the first liquid level sensor 46, the second liquid level sensor 47 and the third liquid level sensor 48 are fixedly arranged on the combustion groove 13. In use, the temperature sensor 45 is used for detecting the temperature of the combustion groove 13 in real time; the first liquid level sensor 46 is used for detecting a high liquid level value of alcohol in the combustion groove 13 in real time; the second liquid level sensor 47 is used for detecting a low liquid level value of the alcohol in the combustion groove 13; and the third liquid level sensor 48 is used for preventing the alcohol in the combustion groove 13 from overflowing.

**[0022]** The start switch 41, the ignition switch 42, the ignition needle 44, the temperature sensor 45, the first liquid level sensor 46, the second liquid level sensor 47, the third liquid level sensor 48, the loudspeaker 49, the alcohol self-priming pump 24, the submersible pump 25, the first cooling self-priming pump 33 and the second cooling self-priming pump 34 are electrically connected to the main control board 43.

**[0023]** According to the liquid-cooled intelligent alcohol fireplace of the embodiment, the cooling liquid stored in the cooling liquid container 36 utilizes liquid which is suitable as a cooling medium, and water is preferred in the embodiment.

**[0024]** The working principle and procedure of the liquid-cooled intelligent alcohol fireplace of the embodiment are briefly described as follows:

the liquid-cooled intelligent alcohol fireplace of the embodiment is externally connected to a mains supply AC220V, the circuit assembly 4 starts, the start switch 41 of the circuit assembly 4 is pressed down, the main control board 43 broadcasts fuel addition through the loudspeaker 49, the main control board 43 controls the alcohol self-priming pump 24 to start working, and the alcohol is pumped into the alcohol storage box 12 through the above alcohol conveying channel; at this time, the ignition switch 42 is switched on, the main control board 43 controls the submersible pump 25 to start working, the alcohol is automatically added into the combustion groove 13 through the above alcohol conveying channel, the main control board 43 controls the ignition needle 44 to ignite at the same time (and the ignition needle 44 is closed after ten seconds), the main control board 43 controls the submersible pump 25 to stop working when the liquid level of the added alcohol in the combustion groove 13 is detected by the first liquid level sensor 46 or the third liquid level sensor 48, and the main control board 43 controls the submersible pump 25 to start working again to add the alcohol when the liquid level of the added alcohol in the combustion groove 13 is detected by the second liquid level sensor 47 in use, repeating in this way.

**[0025]** In order to prevent the alcohol from boiling too much and prevent the flame from oversizing when the alcohol combusts in the combustion groove 13, the main control board 43 controls the first cooling self-priming pump 33 and the second cooling self-priming pump 34 to start working when the temperature sensor 45 detects the temperature of the combustion groove to reach a threshold, so as to use the liquid coolant flowing in the first cooling pipe 31 and the second cooling pipe 32 to bring the heat away to achieve the cooling, and to correspondingly achieve an objective of controlling the size of the alcohol combustion flame, which is safe and saves energy.

**[0026]** The above embodiment is intended to illustrate specific embodiments of the present disclosure, but not to limit the present disclosure. Those skilled in the related art can further make various modifications and variations without departing from the spirit and scope of the present disclosure to obtain corresponding equivalent technical schemes such that all those equivalent technical schemes should fall into the protection scope of the present disclosure.

## Claims

1. A liquid-cooled intelligent alcohol fireplace, comprising a fireplace body (1), wherein the fireplace body (1) comprises a shell (11), an alcohol storage box (12), a combustion groove (13) and a faceplate (14); **characterized by** further comprising an alcohol supplying assembly (2), a liquid cooling assembly (3) and a circuit assembly (4); wherein

   the alcohol supplying assembly (2) comprises an alcohol container (21), alcohol supply pipes (22), an alcohol inlet (23), an alcohol self-priming pump (24), a submersible pump (25) and an alcohol discharge head (26); the alcohol container (21) and the fireplace body (1) being separately arranged; the alcohol inlet (23) being fixedly formed in the faceplate (14), and the alcohol self-priming pump (24) and the submersible pump (25) being fixedly mounted in the shell (11); the alcohol discharge head (26) being fixedly arranged on the combustion groove (13); whereby the alcohol container (21), the alcohol inlet (23), the alcohol self-priming pump (24), the alcohol storage box (12), the submersible pump (25), the alcohol discharge head (26) and the alcohol supply connecting pipes (22) form alcohol conveying channels;

   the liquid cooling assembly (3) comprises a first cooling pipe (31), a second cooling pipe (32), a first cooling self-priming pump (33), a second cooling self-priming pump (34), cooling liquid

flowing pipes (35) and a cooling liquid container (36); the first cooling pipe (31) and the second cooling pipe (32) being fixedly arranged in the lower portion of the combustion groove (13); the first cooling pipe (31), the first cooling self-priming pump (33), the cooling liquid container (36) and the cooling liquid flowing connecting pipes (35) forming a first liquid cooling channel; the second cooling pipe (32), and the second cooling self-priming pump (34), the liquid container (36) and the cooling liquid flowing connecting pipes (35) forming a second liquid cooling channel; and

the circuit assembly (4) comprises a start switch (41), an ignition switch (42), a main control board (43), an ignition needle (44), a temperature sensor (45), a first liquid level sensor (46), a second liquid level sensor (47) and a third liquid level sensor (48); the start switch (41) and the ignition switch (42) being fixedly arranged on the faceplate (14); the main control board (43) being fixedly arranged in the shell (11); the ignition needle (44) being fixedly arranged on the combustion groove (13) and located by the side of the alcohol discharge head (26); the temperature sensor (45), the first liquid level sensor (46), the second liquid level sensor (47) and the third liquid level sensor (48) being fixedly arranged on the combustion groove (13); and the start switch (41), the ignition switch (42), the ignition needle (44), the temperature sensor (45), the first liquid level sensor (46), the second liquid level sensor (47), the third liquid level sensor (48), the alcohol self-priming pump (24), the submersible pump (25), the first cooling self-priming pump (33) and the second cooling self-priming pump (34) being electrically connected to the main control board (43).

2. The liquid-cooled intelligent alcohol fireplace according to claim 1, **characterized in that** the circuit assembly (4) further comprises a loudspeaker (49) electrically connected to the main control board (43).

3. The liquid-cooled intelligent alcohol fireplace according to claim 1 or 2, **characterized in that** a thermal insulator (15) is arranged between the faceplate (14) of the fireplace body (1) and the combustion groove (13).

4. The liquid-cooled intelligent alcohol fireplace according to claim 3, **characterized in that** the thermal insulator (15) is made of bakelite.

5. The liquid-cooled intelligent alcohol fireplace according to claim 1, **characterized in that** heat dissipation holes (11-1-1) are formed in the shell (11).

6. The liquid-cooled intelligent alcohol fireplace according to claim 1, **characterized in that** the material of the combustion groove (13) is aluminum alloy.

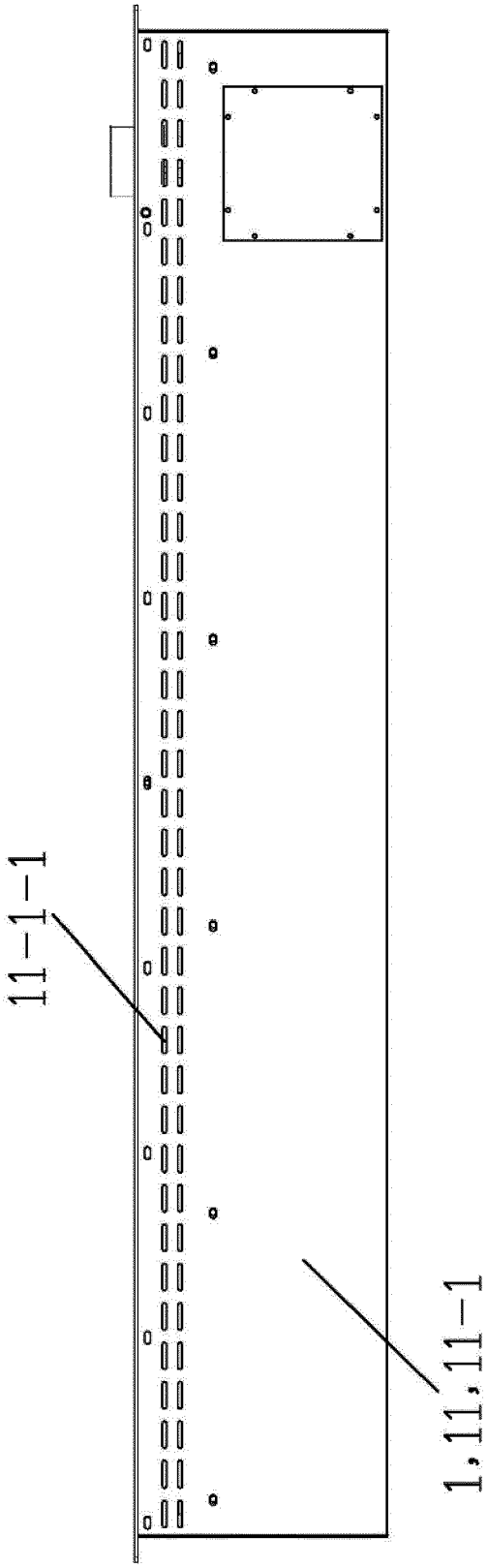


FIG. 1

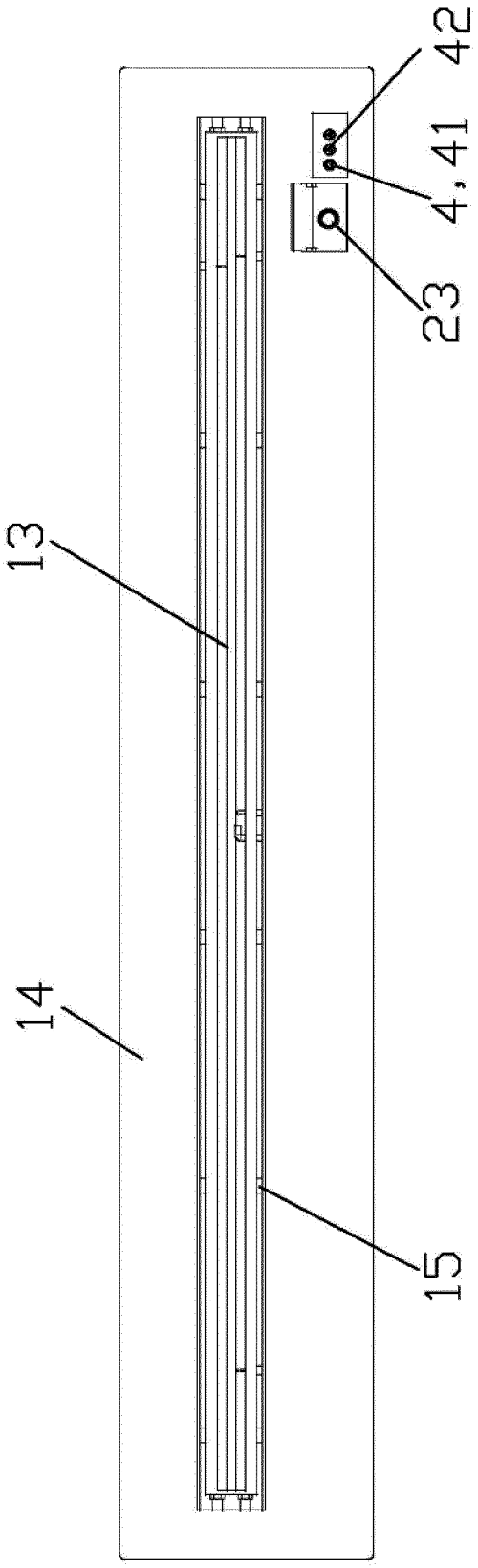


FIG. 2

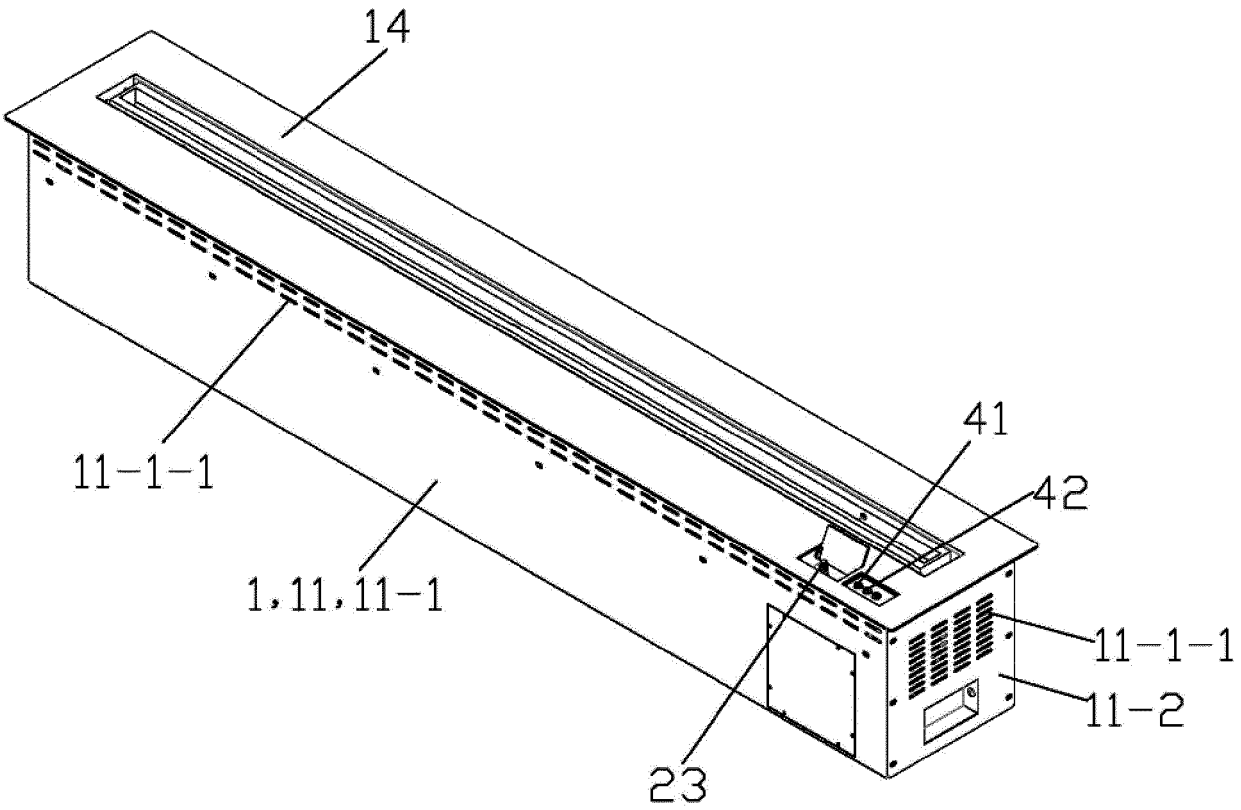


FIG. 3

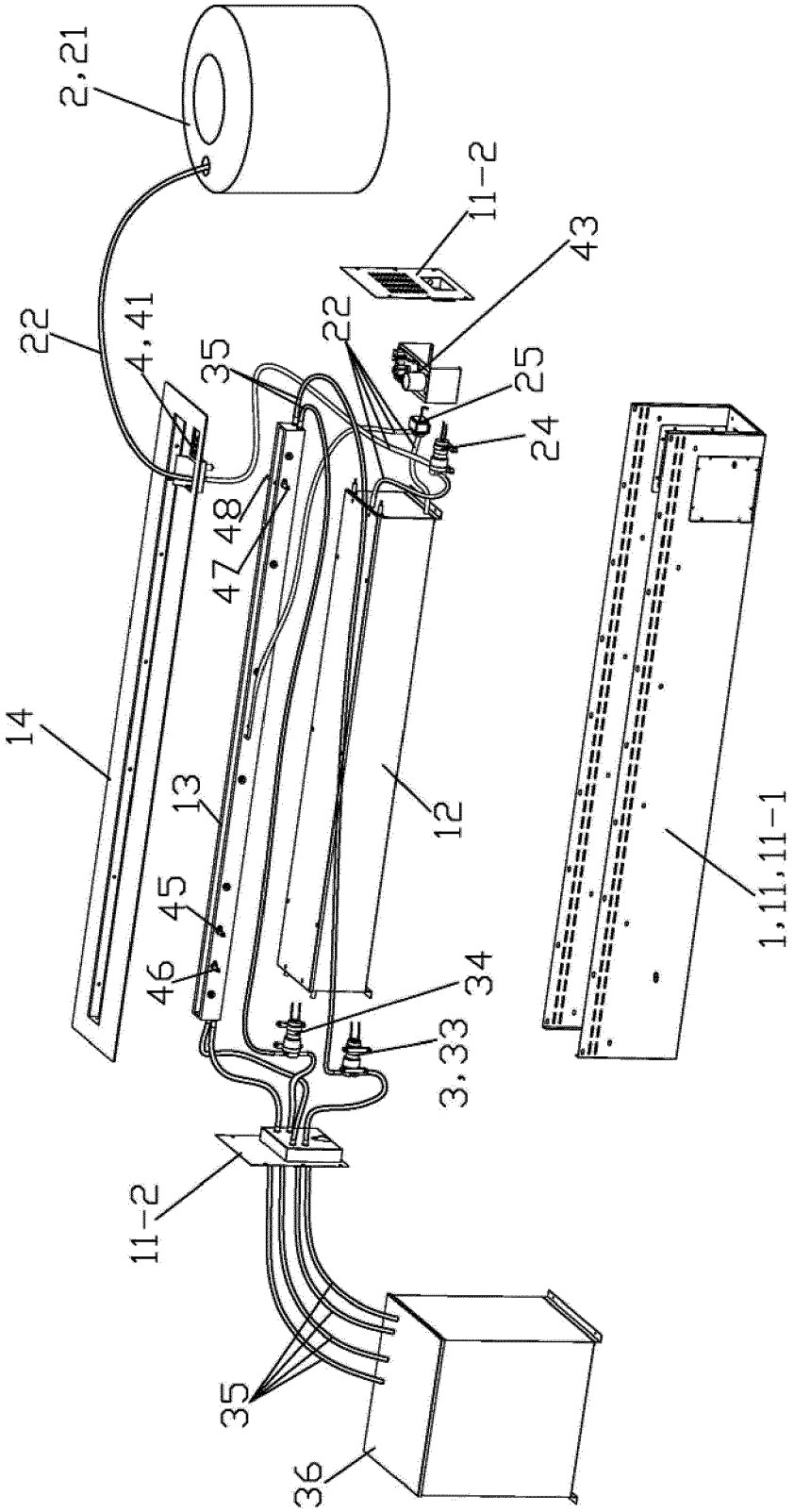
2,21
11-2
43
22
4,41
22
35
25
24
47
48
14
13
12
45
46
34
3,33
1,11,11-1
11-2
35
36

FIG. 4

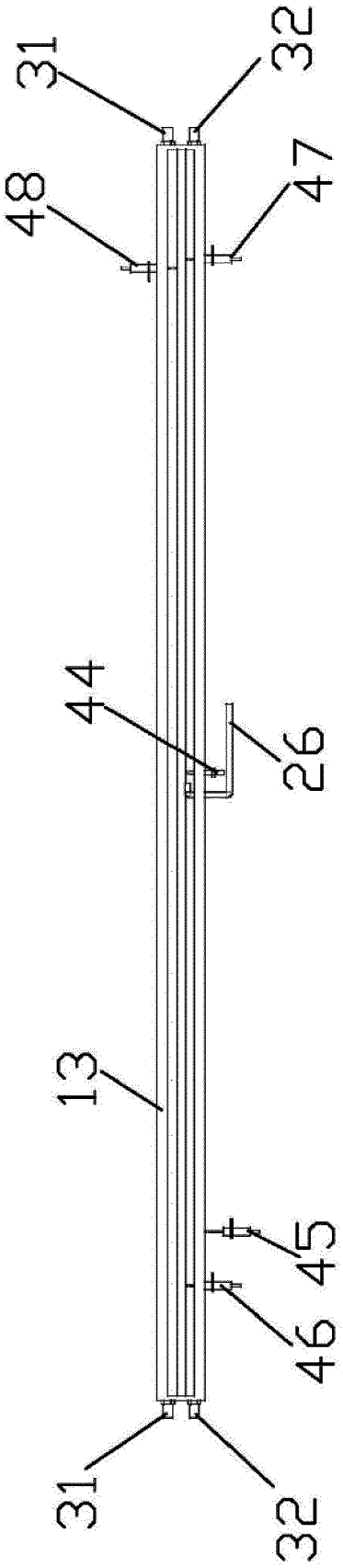


FIG. 5

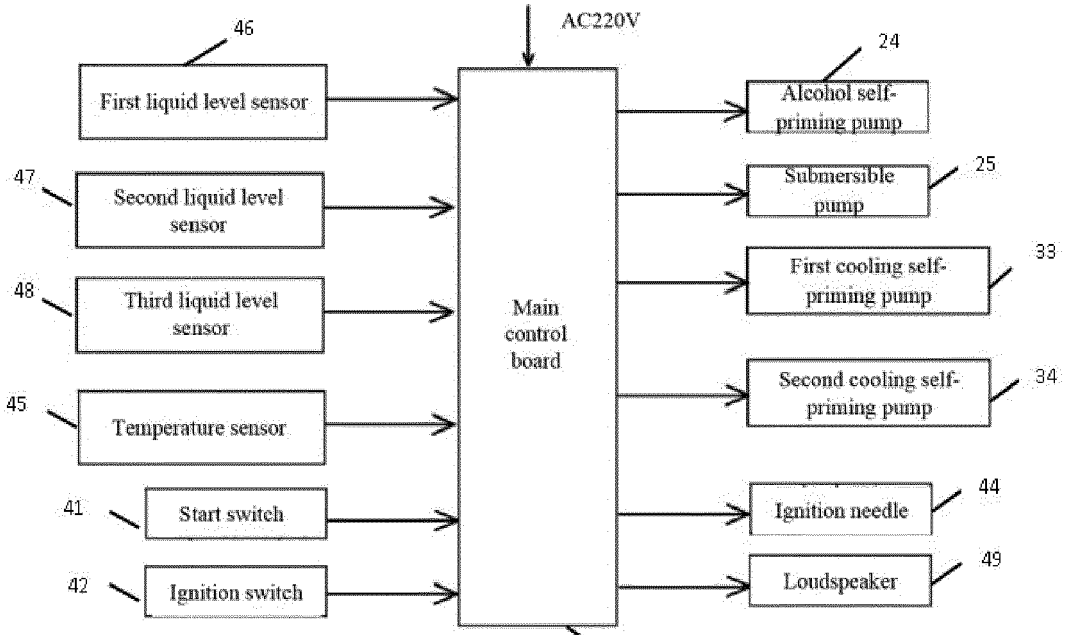
AC220V
46
First liquid level sensor
47
Second liquid level sensor
48
Third liquid level sensor
45
Temperature sensor
41
Start switch
42
Ignition switch
Main control board
43
24
Alcohol self-priming pump
25
Submersible pump
33
First cooling self-priming pump
34
Second cooling self-priming pump
44
Ignition needle
49
Loudspeaker

FIG. 6

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# EUROPEAN SEARCH REPORT

Application Number
EP 19 19 0688

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| X | WO 2019/033686 A1 (CHANGZHOU ENTU ELECTROMECHANICAL TECH CO LTD [CN]) 21 February 2019 (2019-02-21) * claims 1-6; figures 1-6 * | 1-6 | INV. F24C5/18 F24C5/16 F24C5/14 |

TECHNICAL FIELDS SEARCHED (IPC)

F24C

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 16 January 2020 | Fest, Gilles |

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16-01-2020

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
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