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(72) Inventors:
• **DONG, Qingzhong**
DunHua, Jilin 133700 (CN)
• **LIU, Baiqian**
Beijing, 100000 (CN)
• **DONG, Weiqi**
Dunhua, Jilin 133700 (CN)
• **LIU, Shiyuan**
Beijing, 100000 (CN)

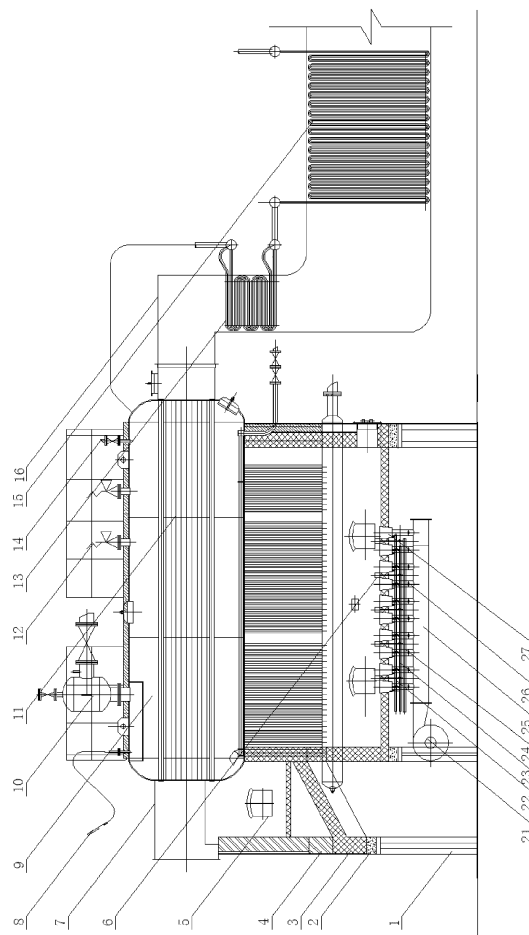
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(71) Applicant: **Dong, Qingzhong**
133700 DunHua Jilin (CN)

(74) Representative: **Sun, Yiming**
HUASUN Patent- und Rechtsanwälte
Friedrichstraße 33
80801 München (DE)

(54) **AN ALCOHOL-BASED FUEL BOILER**

(57) The invention discloses an alcohol-based fuel boiler, comprising: a body, a burner (18), a drum (9), a economizer (13) and a condenser tube bundle (15); wherein, a combustion chamber is arranged in the body, the burner (18) is arranged below the combustion chamber, the middle part of the drum (9) is arranged on the upper end of the combustion chamber, an inlet flue (7) is arranged on one end of the drum and an outlet flue is arranged on an other end (16), the economizer (13) and the condenser tube bundle (15) are arranged in sequence on the outlet flue, the condenser tube bundle connects with the economizer and the economizer connects with the drum, and a smoke-fire tube (11) is arranged in the internal center of the drum (9); the horizontal arrangement of burner and application of alcohol-based fuel effectively increase the heating area of the drum, and the economizer and the condenser tube bundle arranged on the outlet flue effectively absorb the heat in the outlet flue to improve energy utilization and reduce operating costs.



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Description

Field of the Invention

[0001] The Invention relates generally to the technical field of steam boiler, and specifically to an alcohol-based fuel boiler.

Background of the Invention

[0002] People need to heat the room up in winter. The current heating method is to transfer steam, which comes mainly from a boiler, into the radiator installed indoor. Since the boiler normally takes coal as the fuel, such burning of coal produces great amount of pollutants, which intensifies air pollution and aggravates the fog and haze. Therefore, the boiler burning clean energy is urgently demanded to cope with the increasingly heavy environmental pollution.

Summary of the Invention

[0003] The technical problem to be solved by the Invention is to provide a boiler which burns alcohol-based fuel and other clean energies to reduce environmental pollution.

[0004] The technical scheme of the Invention to solve the above technical problem is as follows: an alcohol-based fuel boiler, comprising: a body, a burner, a drum, a coal economizer and a condensate tube bundle; wherein, a combustion chamber is arranged in the body; the burner is arranged below the combustion chamber; the middle part of the drum is arranged on the upper end of the combustion chamber; an inlet flue is arranged on one end of the drum and an outlet flue is arranged on the other end; the coal economizer and the condensate tube bundle are arranged in sequence on the outlet flue; the condensate tube bundle connects with the coal economizer and the coal economizer connects with the drum; and a smoke-fire tube is arranged in the internal center of the drum.

[0005] As a preferred embodiment, the burner comprises a blower, a fuel overflow header pipe, a fuel header pipe, ignition fuel pipes, air ducts, butterfly valves and fire gathering rings; wherein, the fire gathering rings are arranged in plural rectangular arrays; the middle part of the fire gathering rings connect with the fuel header pipe; in the fire gathering rings, one side of the fuel header pipe connects with the fuel overflow header pipe; the blower connects to the lower end of the fire gathering rings through the air ducts; the butterfly valves controlling the open-close operations are arranged on the pipe connecting the air ducts and the fire gathering rings; an igniter is arranged in the middle of the four adjacent fire gathering rings; and the igniter connects with the ignition fuel pipes.

[0006] As a preferred embodiment, the body comprises a support arranged at the bottom, which has a con-

crete front beam, a front sealing wall and a front wall; a man hole is further arranged on the body.

[0007] As a preferred embodiment, an inflected smoke passage is arranged in the combustion chamber; a convection water pipe is arranged in the inflected smoke passage; the upper end of the convection water pipe connects with the drum; and the lower end of the convection water pipe connects with the header in the body.

[0008] As a preferred embodiment, a sewage suction pipe is arranged below the drum; the outlet of the sewage suction pipe extends to the outside of the body; and a drain valve is arranged at the outlet of the sewage suction pipe.

[0009] As a preferred embodiment, two headers are arranged respectively on the side walls of the body; and the same ends of the two headers are connected through a connecting pipe.

[0010] As a preferred embodiment, a pressure gauge, a main steam pipe, a safety valve and a thermometer are arranged on the drum.

[0011] The beneficial effects of the Invention with the above technical schemes are that: the horizontal arrangement of burner and application of alcohol-based fuel effectively increase the heating area of the drum; the coal economizer and the condensate tube bundle arranged on the outlet flue effectively absorb the heat in the outlet flue to improve energy utilization and reduce operating costs.

Brief Description of the Drawings

[0012] In order to illustrate the technical schemes in the embodiments of the Invention or in prior art more clearly, the drawings required in description of the embodiments or prior art will be introduced briefly as follows. Obviously, the drawings described below are just a part of the embodiments of the Invention. A person skilled in the art is able to obtain other drawings according to these drawings without any creative work.

Fig. 1 is a structural diagram of the Invention;

Fig. 2 is a side section view of the Invention;

Fig. 3 is a top view of the Invention;

Fig. 4 is a structural diagram of the burner of the Invention.

[0013] Wherein: 1 - support, 2 - concrete front beam, 3 - front sealing wall, 4 - front wall, 5 - man hole, 6 - igniter, 7 - inlet flue, 8 - pressure gauge, 9 - drum, 10 - main stem pipe, 11 - smoke-fire tube, 12 - safety valve, 13 - coal economizer, 14 - thermometer, 15 - condensate tube bundle, 16 - outlet flue, 17 - drain valve, 18 - burner, 19 - inflected smoke passage, 20 - convection water pipe, 21 - blower, 22 - fuel overflow header pipe, 23 - fuel header pipe, 24 - ignition fuel pipes, 25 - air duct, 26 - butterfly

valve, 27- fire gathering ring, 28 - header, 29 - sewage suction pipe.

Description of the Preferred Embodiments

[0014] The Invention is further described in combination with drawings and embodiments as follows. It shall be noted that, the description of these embodiments is for providing further understanding of the Invention, and does not form a restriction therefor. Moreover, the technical features related to the embodiments of the Invention described as follows can combine with each other provided that they are not conflicted with each other.

[0015] The Invention will be further described in combination with the following drawings for better application of the Invention by a person skilled in the art: as shown in Fig. 1 and Fig. 2, the alcohol-based fuel boiler of the invention embodiment comprises a body, a burner 18, a drum 9, a coal economizer 13 and a condensate tube bundle 15; a combustion chamber is arranged in the body; the burner 18 is arranged below the combustion chamber; the middle part of the drum 9 is arranged on the upper end of the combustion chamber; an inlet flue 7 is arranged on one end of the drum 9 and an outlet flue 16 is arranged on the other end; the coal economizer 13 and the condensate tube bundle 15 are arranged in sequence on the outlet flue 16; the condensate tube bundle 15 connects with the coal economizer 13 and the coal economizer 13 connects with the drum 9; and a smoke-fire tube 11 is arranged in the internal center of the drum 9.

[0016] As shown in Fig. 1, Fig. 2 and Fig. 3, in order to achieve burning of alcohol-based fuel in the present invention embodiment, the burner 18 comprises a blower 21, a fuel overflow header pipe 22, a fuel header pipe 23, ignition fuel pipes 24, air ducts 25, butterfly valves 26 and fire gathering rings 27; wherein, the fire gathering rings 27 are arranged in plural rectangular arrays; the middle part of the fire gathering rings 27 connect with the fuel header pipe 23; in the fire gathering rings 27, one side of the fuel header pipe 23 connects with the fuel overflow header pipe 22; the blower 21 connects to the lower end of the fire gathering rings 27 through the air ducts 25; the butterfly valves controlling the open-close operations 26 are arranged on the pipe connecting the air ducts 25 and the fire gathering rings 27; an igniter 6 is arranged in the middle of the four adjacent fire gathering rings 27; and the igniter 6 connects with the ignition fuel pipes 24. The heat released after ignition of the burner 18 can ignite the hydrogen and oxygen molecules in the alcohol-based fuel released from the fuel header pipe 23 so as to improve combustion rate.

[0017] As shown in Fig. 1 and Fig. 2, the body of the invention embodiment comprises a support 1 arranged at the bottom, which has a concrete front beam 2, a front sealing wall 3 and a front wall 4; a man hole 5 is further arranged on the body. An inflected smoke passage 19 is arranged in the combustion chamber; a convection water pipe 20 is arranged in the inflected smoke passage

19; the upper end of the convection water pipe 20 connects with the drum 9; the lower end of the convection water pipe 20 connects with the header 28 in the body; a sewage suction pipe 29 is arranged below the drum 9; the outlet of the sewage suction pipe 29 extends to the outside of the body; a drain valve 17 is arranged at the outlet of the sewage suction pipe 29; two headers 28 are arranged respectively on the side walls of the body; and the same ends of the two headers 28 are connected through a connecting pipe.

[0018] As shown in Fig. 1 and Fig. 3, a pressure gauge 8, a main steam pipe 10, a safety valve 12 and a thermometer 14 are arranged on the drum 9 of the invention embodiment.

[0019] The burner 18 of the invention embodiment adopts horizontal arrangement and alcohol-based fuel, which effectively increases the heating area of the drum 9; the coal economizer 13 and the condensate tube bundle 15 arranged on the outlet flue 16 effectively absorb the heat in the outlet flue 16 to improve energy utilization and reduce operating costs.

[0020] The above is a detailed description for the embodiments of the Invention in combination with drawings, but the embodiments of the Invention are not limited to it. For a person skilled in the art, various changes and amendments, replacements and deformations made under the premise of not departing from the spirit and essence of the Invention still fall within the protection scope of the Invention.

Claims

1. An alcohol-based fuel boiler, **characterized in** comprising a body, a burner, a drum, a coal economizer and a condensate tube bundle; wherein, a combustion chamber is arranged in the body; the burner is arranged below the combustion chamber; the middle part of the drum is arranged on the upper end of the combustion chamber; an inlet flue is arranged on one end of the drum and an outlet flue is arranged on the other end; the coal economizer and the condensate tube bundle are arranged in sequence on the outlet flue; the condensate tube bundle connects with the coal economizer and the coal economizer connects with the drum; and a smoke-fire tube is arranged in the internal center of the drum.
2. The alcohol-based fuel boiler according to Claim 1, **characterized in that** the burner comprises a blower, a fuel overflow header pipe, a fuel header pipe, ignition fuel pipes, air ducts, butterfly valves and fire gathering rings; wherein, the fire gathering rings are arranged in plural rectangular arrays; the middle part of the fire gathering rings connect with the fuel header pipe; in the fire gathering rings, one side of the fuel header pipe connects with the fuel overflow header pipe; the blower connects to the lower end

of the fire gathering rings through the air ducts; the butterfly valves controlling the open-close operations are arranged on the pipe connecting the air ducts and the fire gathering rings; an igniter is arranged in the middle of the four adjacent fire gathering rings; and the igniter connects with the ignition fuel pipes. 5

3. The alcohol-based fuel boiler according to Claim 1, **characterized in that** the body comprises a support arranged at the bottom, which has a concrete front beam, a front sealing wall and a front wall; a man hole is further arranged on the body. 10

4. The alcohol-based fuel boiler according to Claim 1, **characterized in that** an inflected smoke passage is arranged in the combustion chamber; a convection water pipe is arranged in the inflected smoke passage; the upper end of the convection water pipe connects with the drum; and the lower end of the convection water pipe connects with the header in the body. 15 20

5. The alcohol-based fuel boiler according to Claim 4, **characterized in that** a sewage suction pipe is arranged below the drum; the outlet of the sewage suction pipe extends to the outside of the body; and a drain valve is arranged at the outlet of the sewage suction pipe. 25

6. The alcohol-based fuel boiler according to Claim 4, **characterized in that** two headers are arranged respectively on the side walls of the body; and the same ends of the two headers are connected through a connecting pipe. 30 35

7. The alcohol-based fuel boiler according to Claim 1, **characterized in that** a pressure gauge, a main steam pipe, a safety valve and a thermometer are arranged on the drum. 40

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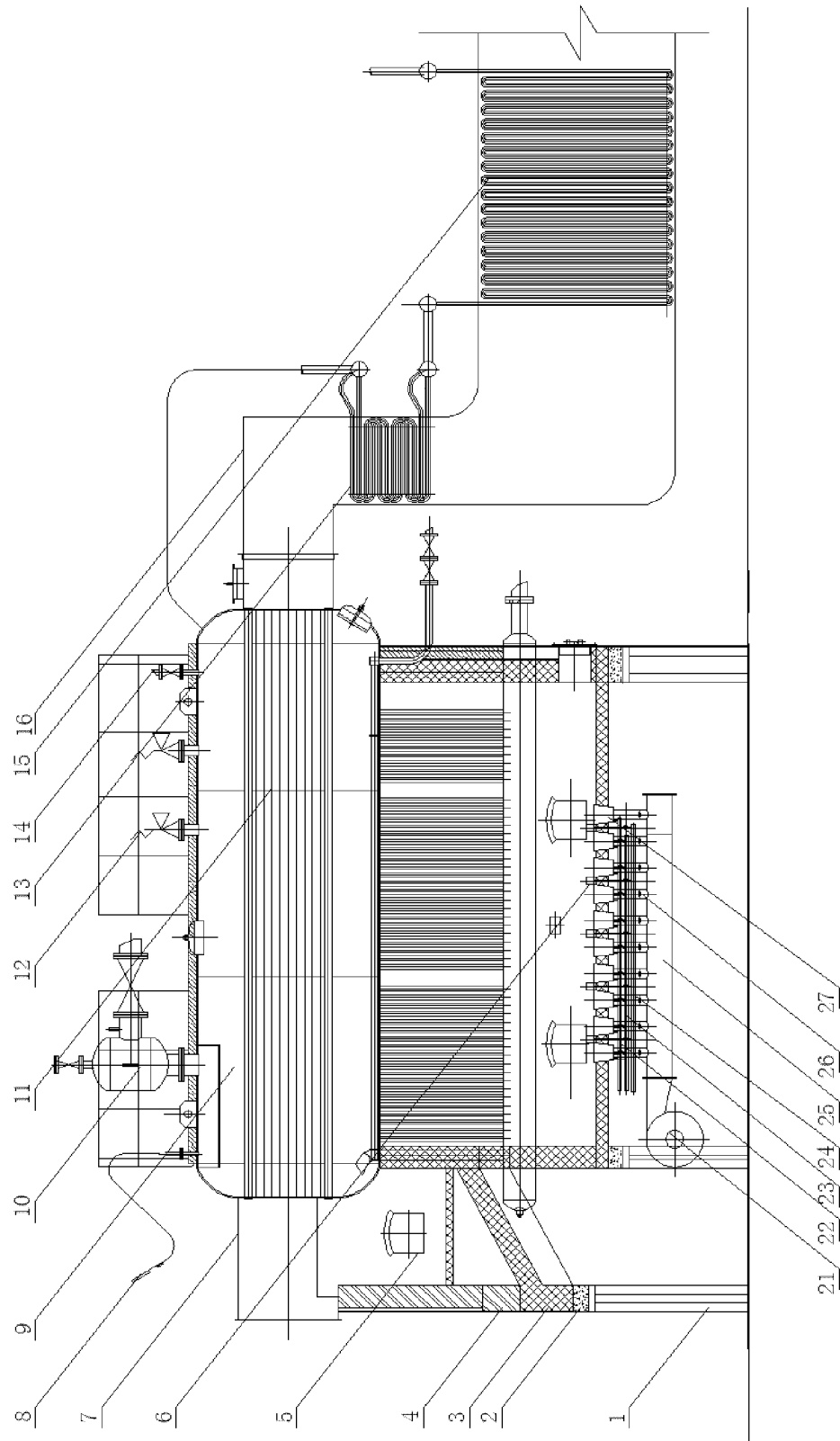


FIG. 1

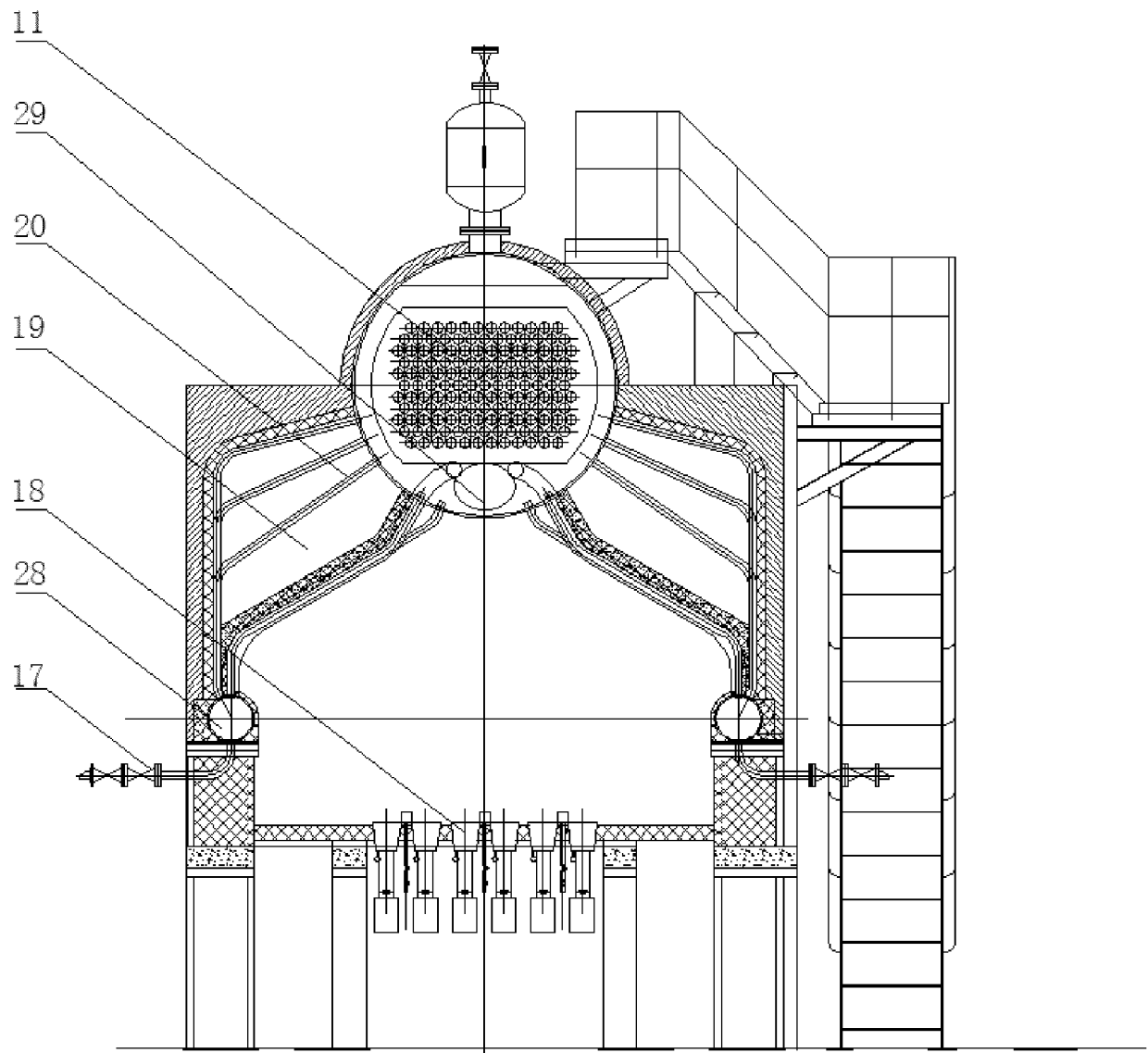


FIG. 2

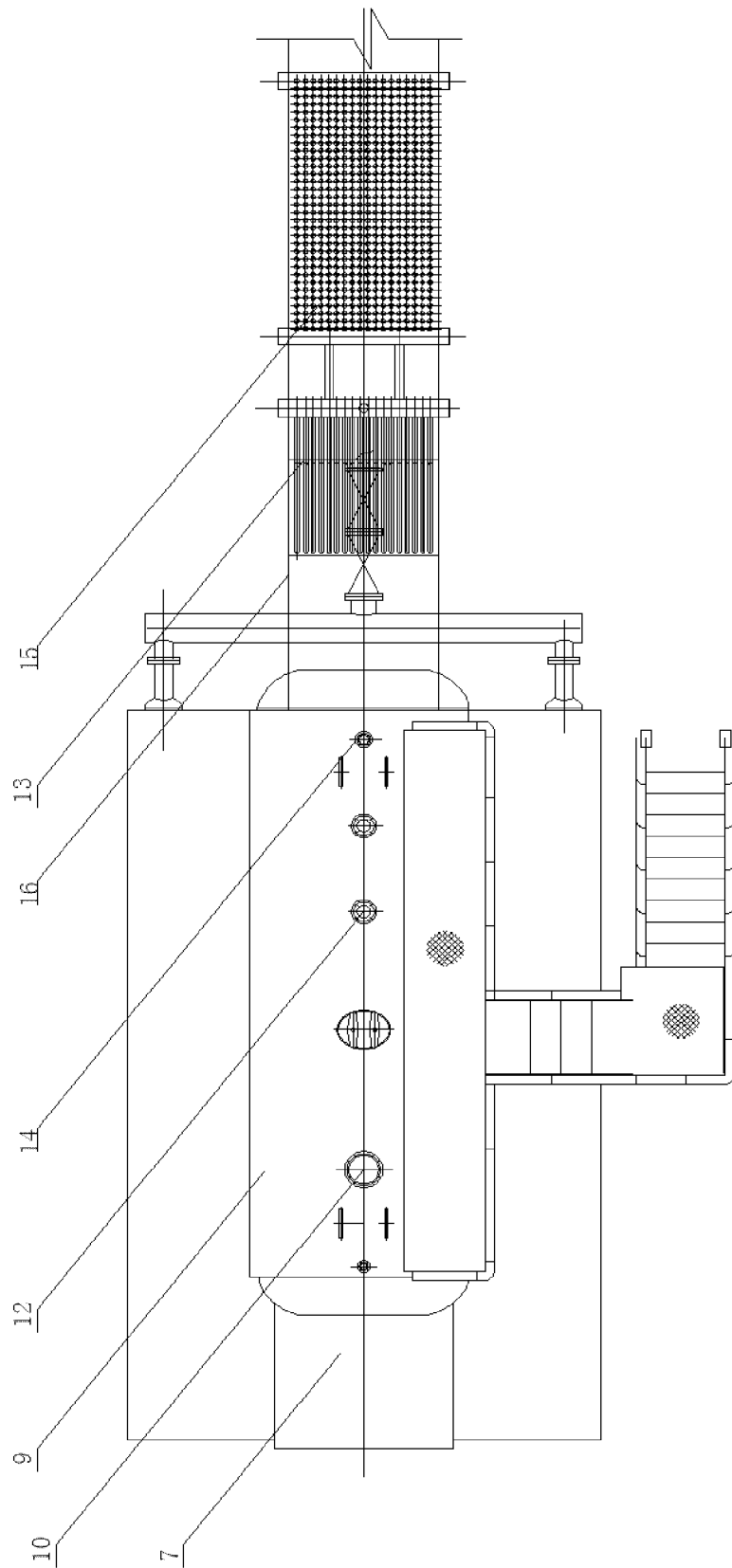


FIG. 3

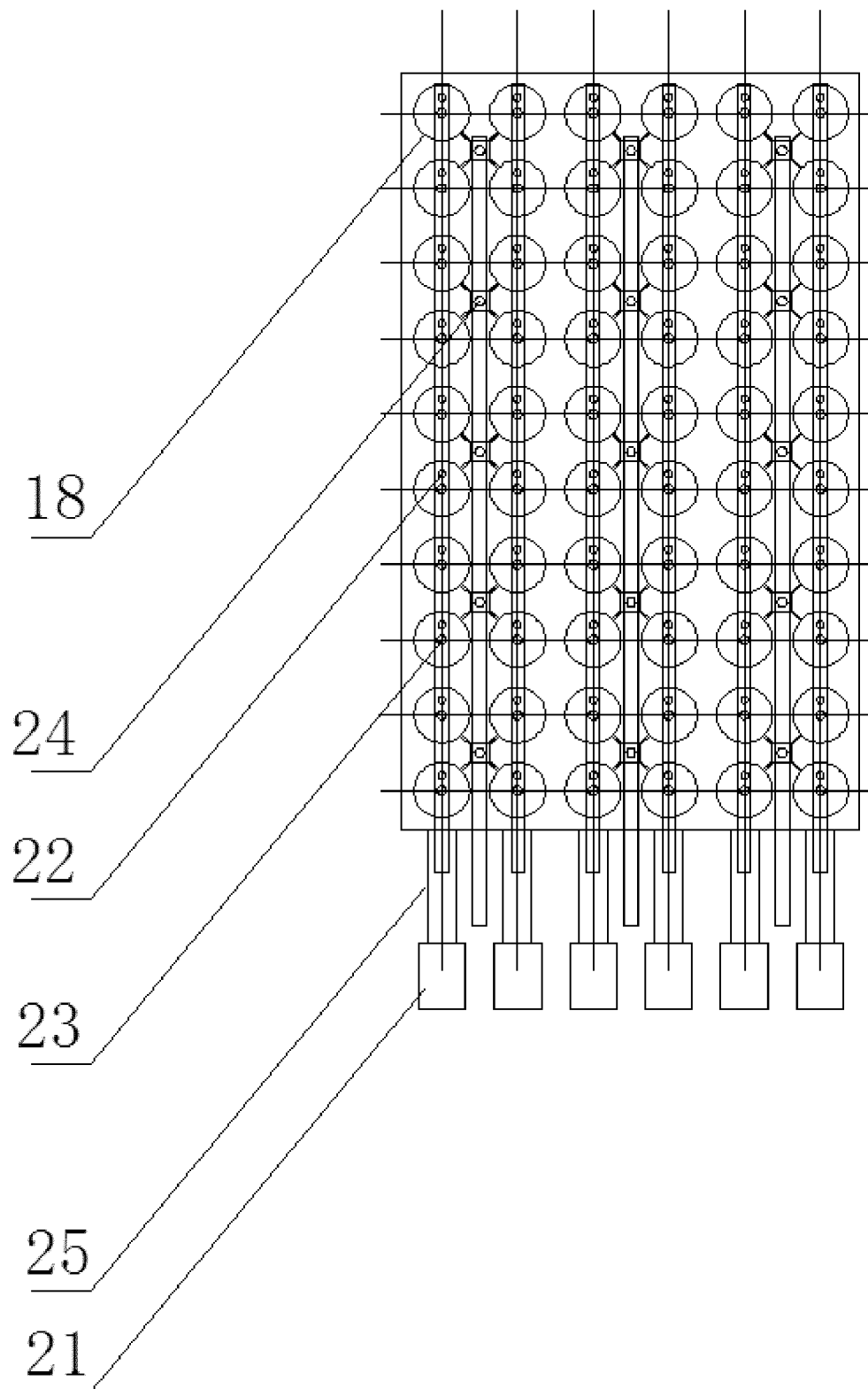


FIG. 4



EUROPEAN SEARCH REPORT

 Application Number
 EP 18 15 0914

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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	CN 106 838 937 A (ZHEJIANG SHUANGFENG BOILER CO LTD) 13 June 2017 (2017-06-13) * paragraph [0002]; figures 1-3 *	1-3,7	INV. F22B9/12 F23C3/00
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A	US 2009/126653 A1 (GRAVES RAYMOND ALEXANDER [CA]) 21 May 2009 (2009-05-21) * paragraph [0002]; figures 2, 3 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			F22B F23C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 July 2018	Examiner Nicolas, Pascal
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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 EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 18 15 0914

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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13-07-2018

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82