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(54) **PREMIXED COMBUSTION DEVICE FOR A HEATING EQUIPMENT**

(57) Disclosed is a premixed combustion device for burning a heating equipment. The premixed combustion device for burning the heating equipment includes a housing, a combustion chamber provided in the housing, a volatilization chamber provided on a side of an upper portion of the combustion chamber in the housing, an ignition device provided at an end of the volatilization chamber away from the combustion chamber; a fuel supply pipe provided on a side of the volatilization chamber and communicated with the volatilization chamber; an air inlet provided on a side wall of the volatilization chamber and located between the fuel supply pipe and the ignition device, a bottom plate provided outside the combustion chamber and below the volatilization chamber, and a dust removing device provided on the bottom plate and matching with the air inlet.

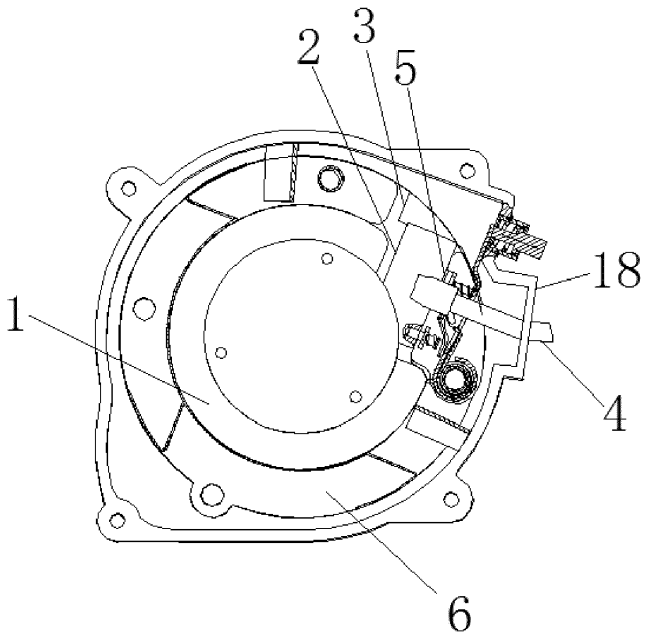


FIG. 1

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## Description

### TECHNICAL FIELD

**[0001]** The present disclosure relates to the technical field of vehicle air heating, in particular to a premixed combustion device for burning a heating equipment.

### BACKGROUND

**[0002]** Air fuel heaters and liquid fuel heaters are the main heating equipment for transport equipment or mobile equipment, which are also the most widely used heating modes at home and abroad. They are mainly used in family cars, passenger cars, engineering vehicles and engineering machinery, various non-fixed or fixed heat supply equipment. At present, the heaters commonly used at home and abroad have similar structures, which mainly include a combustion head, a combustion chamber, an exchanger, a switch control device, a fuel supply device, a heat medium conversion medium power device, and so on. The main manifestation is that when the power is turned on, the heater proceeds in an orderly manner according to preset actions, and the fuel supply device mixes fuel and air into a mixture with a certain combustion concentration, which are mainly fuel and oxygen molecules in air, which are sent to the secondary mixing and combustion chamber through the main fan. When the mixture is further matching with the fuel conditions, the contact area between the fuel and the oxygen molecule is increased. The ignition plug consumes electric power to do work, so that the combustion conditions of the mixed combustion chamber are available. After being ignited, the heat energy is transported to the heat exchange part of the exchanger through the main fan. After the conversion process of heat absorption and heat release, the heated medium (air, liquid) is provided by means of radiation, convection and heat conduction.

**[0003]** Nowadays, due to the insufficient premixed concentration of the fuel and the oxygen molecules in air, the fuel heater loses its basic function, that is, cannot be burned. This phenomenon occurs in domestic and foreign products. From the volatile fuel oil structure to the present, the current more advanced solution is to install an air shield at the position of the air inlet of the combustion chamber. Its working principle is to remove dust in the air, reduce the possibility of obstruction at the air inlet, so as to maintain the working of the heater, but the effect of this structure is not obvious.

### SUMMARY

**[0004]** In order to solve the above technical problems, the present disclosure provides a premixed combustion device for burning a heating equipment.

**[0005]** The premixed combustion device for burning the heating equipment includes a housing, a combustion chamber provided in the housing, a volatilization chamber provided on a side of an upper portion of the combustion chamber in the housing, an ignition device provided at an end of the volatilization chamber away from the combustion chamber; a fuel supply pipe provided on a side of the volatilization chamber and communicated with the volatilization chamber; an air inlet provided on a side wall of the volatilization chamber and located between the fuel supply pipe and the ignition device, a bottom plate provided outside the combustion chamber and below the volatilization chamber, and a dust removing device provided on the bottom plate and matching with the air inlet;

**[0006]** the dust removing device includes a positioning plate, a reset device provided on the positioning plate, and a dust removing member provided between the reset device and the air inlet and matching with the air inlet; the dust removing member includes a supporting plate vertically provided on the positioning plate and parallel to the volatilization chamber, a dust removing pin sliding through the supporting plate and matching with the air inlet, and a positioning spring provided on a side of the supporting plate away from the air inlet and sleeved on the dust removing pin; and one end of the positioning spring is connected with the supporting plate, and another end of the positioning spring is connected with an end of the dust removing pin.

**[0007]** Further, the reset device includes a tubular spring seat provided on the positioning plate, a reset spring provided outside the tubular spring seat, and a rotating plate provided outside the reset spring; and the dust removing member is provided between the rotating plate and the air inlet.

**[0008]** Further, an air guiding device is provided above the bottom plate; the air guiding device includes a first supporting column vertically passing through a middle of the tubular spring seat and provided on the positioning plate, a second supporting column provided on the bottom plate on another side of the volatilization chamber, and an air deflector provided above the first supporting column and the second supporting column and across two sides of the volatilization chamber; and an inner side of the air deflector is matched with an outer wall of the combustion chamber, and the air deflector is defined with a ventilation hole.

**[0009]** Further, an air intake grille is provided at the ventilation hole.

**[0010]** Further, an air filter device is provided outside the combustion chamber on the bottom plate; the air filter device includes an arc-shaped fixing plate provided outside the combustion chamber and a plurality of air filter plates provided on the bottom plate in a counterclockwise direction along the combustion chamber; and each air filter plate is V-shaped, and one end of each air filter plate is connected with the arc-shaped fixing plate.

**[0011]** Further, each air filter plate includes an arc-shaped plate matching with an outer side of the bottom plate and a connecting plate provided at one end of the arc-shaped plate and connected with the arc-shaped fix-

ing plate.

**[0012]** Further, a height of the arc-shaped fixing plate and a height of the air filter plate are reduced in a counterclockwise direction along the combustion chamber.

**[0013]** Further, the connecting plate is provided with a dust suction hole.

**[0014]** Further, a carbon cleaning device is provided at a junction of the volatilization chamber and the combustion chamber; the carbon cleaning device includes a cleaning member provided at the junction of the volatilization chamber and the combustion chamber, a corner plate provided on a side of the rotating plate close to the volatilization chamber, and a balance plate provided on the corner plate and matching with the cleaning member; and the cleaning member includes a fixed guide plate provided outside the volatilization chamber, a cleaning pin passing through the fixed guide plate and a side wall of the volatilization chamber and slidably provided at the junction of the volatilization chamber and the combustion chamber, and a return spring provided outside the volatilization chamber and sleeved on the cleaning pin.

**[0015]** Further, a mounting hole is defined on an outer side of the housing close to a free end of the rotating plate; the mounting hole is provided with a cleaning drive member matching with the free end of the rotating plate; a sealing plate is provided between the cleaning drive member and the housing, the cleaning drive member includes a cylindrical housing, an ejector rod sliding through the cylindrical housing and matching with the rotating plate, a reset spring provided in the cylindrical housing and matching with the ejector rod, and a sealing member provided in the cylindrical housing; the ejector rod includes an ejector pin portion sliding through one end of the cylindrical housing and matching with the rotating plate, a pressing portion sliding through another end of the cylindrical housing, and a limiting plate provided at a junction of the ejector pin portion and the pressing portion and slidingly fitted with the cylindrical housing; the reset spring is provided on a side of the limiting plate close to the rotating plate, and is sleeved on the ejector pin portion; an O-ring matching with the cylindrical housing is provided on an outer peripheral wall of the limiting plate; and the sealing member is provided at an end of the cylindrical housing away from the rotating plate, and the pressing portion is configured to slide through the sealing member.

**[0016]** The advantages and positive effects of the present disclosure are: the premixed combustion device for burning the heating equipment of the present disclosure is provided with the dust removing device matching with the air inlet, the combination of the dust removing pin and the air inlet can effectively remove the blockage of the dust on the air inlet, facilitate air to enter the volatilization chamber, help fuel and sufficient air to mix, and then help fuel ignition and combustion; the dust removing device is also provided with a reset device to facilitate the quick reset of the dust removing pin to prevent the dust removing pin from blocking the air inlet.

**[0017]** In addition to the technical problems solved by the present disclosure described above, the technical features constituting the technical solutions, and the advantages brought by the technical features of these technical solutions, the other technical problems that can be solved by the present disclosure, the other technical features included in the technical solution, and the advantages brought by these technical features will be described in further detail below in conjunction with the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0018]**

FIG. 1 is a structural schematic view of a premixed combustion device for burning a heating equipment of the present disclosure.

FIG. 2 is a top view of a dust removing device according to an embodiment of the present disclosure.

FIG. 3 is a schematic structural view of a reset device according to an embodiment of the present disclosure.

FIG. 4 is a schematic structural view of an air guiding device and a ventilation hole according to an embodiment of the present disclosure.

FIG. 5 is a schematic structural view of an air intake grille according to an embodiment of the present disclosure.

FIG. 6 is a schematic structural view of an air filter device according to an embodiment of the present disclosure.

FIG. 7 is a schematic structural view of an air filter plate according to an embodiment of the present disclosure.

FIG. 8 is a schematic structural view of a dust suction hole according to an embodiment of the present disclosure.

FIG. 9 is a schematic structural view of a carbon cleaning device according to an embodiment of the present disclosure.

FIG. 10 is a schematic structural view of a cleaning member according to an embodiment of the present disclosure.

FIG. 11 is a schematic view of a mounting hole, a cleaning drive member and a sealing plate according to an embodiment of the present disclosure.

FIG. 12 is a schematic structural view of the cleaning drive member according to an embodiment of the present disclosure.

Description of reference signs

**[0019]** 1 combustion chamber, 2 volatilization chamber, 3 ignition device, 4 fuel supply pipe, 5 air inlet, 6 bottom plate, 7 dust removing device, 710 positioning plate, 720 reset device, 721 tubular spring seat, 722 reset spring, 723 rotating plate, 730 dust removing member,

731 supporting plate, 732 dust removing pin, 733 positioning spring, 8 air guiding device, 810 first supporting column, 820 second supporting column, 830 air deflector, 831 ventilation hole, 831a air intake grille, 9 air filter device, 910 arc-shaped fixing plate, 920 air filter plate, 921 arc-shaped plate, 922 connecting plate, 10 dust suction hole, 11 carbon cleaning device, 12 cleaning member, 13 corner plate, 14 balance plate, 15 fixed guide plate, 16 cleaning pin, 17 return spring, 18 housing, 19 mounting hole, 20 cleaning drive member, 21 sealing plate, 22 cylindrical housing, 23 ejector rod, 23a ejector pin portion, 23b pressing portion, 23c limiting plate, 24 reset spring, 25 sealing member, 26 O-ring.

## DETAILED DESCRIPTION OF THE EMBODIMENTS

**[0020]** The present disclosure will be further described in detail below with reference to the drawings and embodiments. It can be understood that the specific embodiments described herein are only used to explain the related invention, but not to limit the present disclosure. In addition, it should be noted that, for ease of description, only the parts related to the present disclosure are shown in the drawings.

**[0021]** It should be noted that the embodiments of the present disclosure and the features in the embodiments can be combined with each other if there is no conflict. Hereinafter, the present disclosure will be described in detail with reference to the drawings and in conjunction with the embodiments.

**[0022]** As shown in FIG. 1 and FIG. 2, a premixed combustion device for burning a heating equipment includes a housing 18, a combustion chamber 1 provided in the housing 18, a volatilization chamber 2 provided on an upper side of the combustion chamber 1 in the housing 18, an ignition device 3 provided at an end of the volatilization chamber 2 away from the combustion chamber 1, a fuel supply pipe 4 provided on a side of the volatilization chamber 2 and communicated with the volatilization chamber 2, an air inlet 5 provided on a side wall of the volatilization chamber 2 and located between the fuel supply pipe 4 and the ignition device 3, a bottom plate 6 provided outside the combustion chamber 1 and below the volatilization chamber 2, and a dust removing device 7 provided on the bottom plate 6 and matching with the air inlet 5.

**[0023]** The dust removing device 7 includes a positioning plate 710, a reset device 720 provided on the positioning plate 710, and a dust removing member 730 provided between the reset device 720 and the air inlet 5 and matching with the air inlet 5. The dust removing member 730 includes a supporting plate 731 vertically provided on the positioning plate 710 and parallel to the volatilization chamber 2, a dust removing pin 732 sliding through the supporting plate 731 and matching with the air inlet 5, and a positioning spring 733 provided on a side of the supporting plate 731 away from the air inlet 5 and sleeved outside the dust removing pin 732. One end of the positioning spring 733 is connected with the supporting plate 731, and another end of the positioning spring 733 is connected with an end of the dust removing pin 732.

**[0024]** In this embodiment, the premixed combustion device is the main component of the fuel heater, which is provided in the housing 18. The air inlet of the fuel heater is provided on the housing 18 of the fuel heater in the upper of the combustion chamber. The dust removing device 7 is a key component of the premixed combustion device. The dust removing device 7 is provided with the positioning plate 710, the reset device 720 and the dust removing member 730. The positioning plate 710 is the basic component of the dust removing device 7. The reset device 720 and the dust removing member 730 are provided on the positioning plate 710. The positioning plate 710 is convenient to fix the reset device 720 and the dust removing member 730 in proper positions, and facilitate the cooperation of the dust removing member 730 with the air inlet 5. One end of the reset device 720 is fixed on the positioning plate 710, the other end of the reset device 720 is movably provided at an end of the air inlet 5 of the volatilization chamber 2. The dust removing member 730 is provided between the reset device 720 and the air inlet 5, and the dust removing member 730 is matched with the air inlet 5. The dust removing member 730 includes the supporting plate 731, the dust removing pin 732 and the positioning spring 733. The supporting plate 731 is vertically provided on the positioning plate and parallel to the volatilization chamber 2. The dust removing pin 731 slides through the supporting plate to match with the air inlet 5. The end of the dust removing pin away from the air inlet is provided with a brim, and the positioning spring is provided between the brim of the dust removing pin and the supporting plate, and is sleeved on the outside of the dust removing pin. The reset device 720 cooperates with the positioning spring, and the back and forth movement of the reset device 720 drives the dust removing pin 731 to slide in the air inlet 5, thereby facilitating the cleaning of the dust at the air inlet 5, which is helpful for air to enter the volatilization chamber 2, and facilitates the mixing of fuel with sufficient air, thereby helping to ignite and fully burn the fuel.

**[0025]** As shown in FIG, 3, in an embodiment, the reset device 720 includes a tubular spring seat 721 provided on the positioning plate 710, a reset spring 722 provided outside the tubular spring seat 721, and a rotating plate 723 provided outside the reset spring 722. One end of the dust removing pin 731 is fixed on the rotating plate 723.

**[0026]** In this embodiment, the tubular spring seat 721 is a fixing component of the reset device 720. The upper and lower portions of the tubular spring seat 721 can be provided with annular plates. The matching of the annular plates and the tubular spring seat 721 can better fix the reset spring 722 provided outside the tubular spring seat 721. One end of the rotating plate 723 is provided with

an arc-shaped clamping plate, and another end of the rotating plate 723 is movably provided outside the volatilization chamber 2. The rotating plate 723 is matched with the reset spring 722 through an arc-shaped clamping plate. One end of the dust removing pin 731 is provided on the side of the rotating plate 723 close to the air inlet 5.

**[0027]** As shown in FIG. 4, in an embodiment, an air guiding device 8 is provided on an upper of the bottom plate 6. The air guiding device 8 includes a first supporting column 810 vertically passing through a middle of the tubular spring seat 721 and provided on the positioning plate 710, a second supporting column 820 provided on the bottom plate 6 on another side of the volatilization chamber 2, and an air deflector 830 provided on the first supporting column 810 and the second supporting column 820 and across two sides of the volatilization chamber 2. An inner side of the air deflector 830 is matched with an outer wall of the combustion chamber 1, and the air deflector 830 is defined with a ventilation hole 831.

**[0028]** In this embodiment, the first supporting column 810 and the second supporting column 820 are supporting structures for the air deflector 830. The first supporting column 810 and the second supporting column 820 are provided on two sides of the volatilization chamber 2 correspondingly. The first supporting column 810 vertically passes through the middle of the tubular spring seat 721 and is fixed on the positioning plate 710. The second supporting column 820 is provided on the bottom plate 6 on the other side of the volatilization chamber 2. The air deflector 830 is provided on the first supporting column 810 and the second supporting column 820. The upper portion of the air deflector 830 is provided with the ventilation hole 831, so that the air entering the upper portion of the outer side of the combustion chamber 1 flows downward through the ventilation hole 831, and finally enters the volatilization chamber 2 through the air inlet. Both ends of the air deflector 830 are inclined to the bottom plate 6 in the counterclockwise direction of the combustion chamber 1. The air entering the upper portion of the outer side of the combustion chamber 1 moves counterclockwise above the bottom plate 6, and the air above the bottom plate 6 can be raised by the air deflector 830, such that the air speed above the air deflector 830 realizes turbulent flow, thereby avoiding the staying of dust on the air deflector 830, and helps the combustion-supporting air that meets the cleanliness requirement to flow downward through the ventilation hole 831, and then enter the volatilization chamber 2 through the air inlet. The air deflector 830 effectively reduces the amount of dust passing through the ventilation hole 831, and reduces the amount of dust accumulation at the air inlet and the amount of dust entering the volatilization chamber 2, which is convenient for the fuel to be mixed with sufficient air, and helpful for the full combustion of the fuel. A sealing ring can also be provided under the air deflector 830, the sealing ring together with the air deflector 830 and the bottom plate 6 form a sealing passage between the ventilation hole 831 and the air inlet 5, which can effectively prevent dust from entering the air inlet 5 through the gap between the air deflector 830 and the housing 18, and further ensure the cleanliness of the air passing through the air inlet 5.

**[0029]** As shown in FIG. 5, in an embodiment, an air intake grille 831a is provided at the ventilation hole 831. In this embodiment, the air intake grille 831a is a grid plate with a certain aperture. The air intake grille 831a further improves the cleanliness of the air passing through the ventilation hole 831, and reduces the accumulation of dust in the air inlet 5 and the amount of dust entering the volatilization chamber 2, which is helpful for sufficient clean air to be mixed with fuel, and helps to ignite the fuel heater and fully burn the fuel.

**[0030]** As shown in FIG. 6, in an embodiment, an air filter device 9 is provided outside the combustion chamber 1 on the bottom plate 6. The air filter device 9 includes an arc-shaped fixing plate 910 provided outside the combustion chamber 1 and a plurality of air filter plates 920 provided on the bottom plate 6 in a counterclockwise direction along the combustion chamber 1. Each air filter plate 920 is V-shaped, and one end of each air filter plate 920 is connected with the arc-shaped fixing plate 910.

**[0031]** In this embodiment, the arc-shaped fixing plates 910 are provided outside the combustion chamber 1. The air filter plates 920 are provided on the bottom plate 6 in a counterclockwise direction along the combustion chamber 1. Each air filter plate 920 is V-shaped. One end of each air filter plate 920 is fixed on the arc-shaped fixing plate 910. Each air filter plate 920, the arc-shaped fixing plates 910 and the bottom plate 6 form a chamber for accommodating dust. After the air reaches the above of the bottom plate 6, it flows counterclockwise around the combustor in a vortex shape, and passes through the air deflector 830 and the air filter 9 in turn. When passing through the air deflector 830, the incoming wind is raised, and then when passing through each air filter plate 920 of the air filter device 9, the dust moves down along a side wall of the air filter plate 920 under the action of its own gravity and the centrifugal force generated by the vortex flow of the wind, and finally enters the dust receiving chamber formed by the air filter plate 920, the curved fixing plate 910 and the bottom plate 6. The plurality of air filter plates 920 are provided, and the air flow undergoes multi-stage dust removing, which greatly reduces the amount of dust in the air flow and meanwhile greatly improves the dust removing effect of the air filter device 9.

**[0032]** As shown in FIG. 7, in an embodiment, each air filter plate 920 includes an arc-shaped plate 921 matching with an outer side of the bottom plate 6 and a connecting plate 922 provided at one end of the arc-shaped plate 921 and connected with the arc-shaped fixing plate 910. The arc-shaped plate 921 is provided at an outer side of the upper portion of the bottom plate 6. The connecting plate 922 is provided at one end of the arc-shaped plate 921 and is connected to the arc-shaped fixing plate 910 through the connecting plate 922. During the vortex flow of the air flow along the bottom plate 6, the flow

direction of the air flow is tangent to the arc-shaped plate 921. The arc-shaped plate 921 facilitates the downward movement of dust along the side wall of the arc-shaped plate 921 under the action of its own gravity and the centrifugal force generated by the air vortex flow, which further improves the dust removing effect of the air filter device 9. The surfaces of the arc-shaped plate 921 and the connecting plate 922 are rough structural surfaces, which help the air filter plate 920 to collect dust, and further improve the dust removing effect of the air filter device 9.

**[0033]** As shown in FIG. 8, in an embodiment, a height of the arc-shaped fixing plates 910 and a height of the air filter plate 920 are reduced in the counterclockwise direction along the combustion chamber 1.

**[0034]** In this embodiment, during the movement of the air flow, the dust gradually sinks under the action of its own gravity and the centrifugal force generated by the swirling flow of the air flow. The height of the arc-shaped fixing plates 910 and the height of the air filter plates 920 are reduced in the counterclockwise direction of the combustion chamber 1 to facilitate the collection of dust in the air flow, and greatly improve the dust collection efficiency of the air filter device 9.

**[0035]** As shown in FIG. 9, in an embodiment, the connecting plate 922 is provided with a dust suction hole 10. In this embodiment, the dust suction hole 10 is provided on the connecting plate 922. The dust suction hole 10 can provide a variable air flow rate between air layers, prevent the flow of dust and impurities, and facilitate the collection of dust in the chamber formed by each air filter plate 920, the arc-shaped fixing plate 910 and the bottom plate 6.

**[0036]** As shown in FIG. 10, in an embodiment, a carbon cleaning device 11 is provided at a junction of the volatilization chamber 2 and the combustion chamber 1. The carbon cleaning device 11 includes a cleaning member 12 provided at the junction of the volatilization chamber 2 and the combustion chamber 1, a corner plate 13 provided on a side of the rotating plate 723 close to the volatilization chamber 2, and a balance plate 14 provided on the corner plate 13 and matching with the cleaning member 12. The cleaning member 12 includes a fixed guide plate 15 provided outside the volatilization chamber 2, a cleaning pin 16 passing through the fixed guide plate 15 and a side wall of the volatilization chamber 2 and slidably provided at the junction of the volatilization chamber 2 and the combustion chamber 1, and a return spring 17 provided outside the volatilization chamber 2 and sleeved on the cleaning pin 16.

**[0037]** In this embodiment, the carbon cleaning device 11 is provided with the cleaning member 12, the corner plate 13, and the balance plate 14. The cleaning member 12 includes the fixed guide plate 15, the cleaning pin 16, and the return spring 17. The fixed guide plate 15 is provided outside the volatilization chamber 2. The cleaning pin 16 passes through the fixed guide plate 15 and the side wall of the volatilization chamber 2 in turn, and is slidably provided at the junction of the volatilization chamber 2 and the combustion chamber 1 to facilitate cleaning of the carbon at the junction of the volatilization chamber 2 and the combustion chamber 1. The corner plate 13 is provided on the rotating plate 723. One end of the balance plate 14 is provided on the corner plate 13, and another end of the balance plate 14 is matched with the cleaning pin 16. When the rotating plate 723 drives the dust removing device 7 to clean the dust of the air inlet 5, the rotating plate 723 drives the corner plate 13 to move at the same time, which in turn drives the balance plate 14 to move. The balance plate 14 pushes the cleaning pin 16 during the movement to clean up the carbon at the junction of the volatilization chamber 2 and the combustion chamber 1. The carbon cleaning device 11 greatly improves the service life of the volatilization chamber 2 and the combustion chamber 1.

**[0038]** As shown in FIG. 11 and FIG. 12, in an embodiment, a mounting hole 19 is provided at an outer side of the housing 18 close to a free end of the rotating plate 723. The mounting hole 19 is provided with a cleaning drive member 20 matching with the free end of the rotating plate 723. A sealing plate 21 is provided between the cleaning drive member 20 and the housing 18. The cleaning drive member 20 includes a cylindrical housing 22, an ejector rod 23 sliding through the cylindrical housing 22 and matching with the rotating plate 723, a reset spring 24 provided in the cylindrical housing 22 and matching with the ejector rod 23, and a sealing member 25 provided in the cylindrical housing 22. The ejector rod 23 includes an ejector pin portion 23a sliding through one end of the cylindrical housing 22 and matching with the rotating plate 723, a pressing portion 23b sliding through another end of the cylindrical housing 22, and a limiting plate 23c provided at a junction of the ejector pin portion 23a and the pressing portion 23b and slidingly fitted with the cylindrical housing 22. The reset spring 24 is provided on a side of the limiting plate 23c close to the rotating plate 723, and is sleeved on the ejector pin portion 23a. An O-ring 26 matching with the cylindrical housing 22 is provided on an outer peripheral wall of the limiting plate 23c. The sealing member 25 is provided at an end of the cylindrical housing 22 away from the rotating plate 723, and the pressing portion 23b is sliding through the sealing member 25.

**[0039]** In this embodiment, the mounting hole 19 is provided at the outer side of the housing 18 close to the free end of the rotating plate 723. The mounting hole 19 can be a threaded hole. The cleaning drive member 20 is the main structure for driving the rotating plate 723 to move, and can be provided in the mounting hole 19 through threads. The sealing plate 21 is provided between the cleaning drive member 20 and the housing 18, which can effectively prevent external dust from entering the housing 18 through the gap between the cleaning drive member 20 and the mounting hole 19, thereby effectively avoiding the accumulation of dust at the air inlet. The cleaning drive member 20 is provided with the cylindrical

housing 22, the ejector rod 23, the reset spring 24 and the sealing member 25. The ejector rod 23 slides through the two ends of the cylindrical housing 22 to cooperate with the rotating plate 723. The reset spring 24 is provided in the cylindrical housing 22 to cooperate with the ejector rod 23, so as to facilitate the quick reset after the ejector rod 23 pushes the rotating plate 723. The ejector rod 23 is provided with the ejector pin portion 23a, the pressing portion 23b and the limiting plate 23c. The ejector pin portion 23a slides through the cylindrical housing 22 and is close to the end of the rotating plate 723. The pressing portion 23b slides through the cylindrical housing 22 at one end away from the rotating plate 723. The limiting plate 23c is provided at the junction of the ejector pin portion 23a and the pressing portion 23b and is slidably fitted with the cylindrical housing 22. The reset spring 24 is provided on the side of the limiting plate 23c close to the rotating plate 723. During operation, the external force presses the pressing portion 23b into the housing 18, the limiting plate 23c located in the cylindrical housing 22 moves to the side close to the rotating plate 723 and compresses the reset spring 24, and the ejector pin portion 23a pushes the rotating plate 723 to move, the rotating plate 723 pushes the dust removing member to clean the dust at the air inlet, and pushes the cleaning member to clean the carbon deposited at the junction of the combustion chamber and the volatilization chamber. After the external force is removed, the rotating plate 723 is reset under the action of the reset spring, the ejector rod 23 is reset under the action of the reset spring 24, the mutual cooperation of the reset spring 24 and the return spring facilitates the external force to repeatedly and quickly drive the cleaning drive member 20 and the rotating plate 723, thereby helping to clean the dust removing member and the cleaning member to clean up the carbon. The outer peripheral wall of the limiting plate 23c is provided with the O-ring 26 that cooperates with the cylindrical housing 22 to prevent dust from entering the housing 18 through the gap between the cylindrical housing 22 and the limiting plate 23c. The sealing member 25 is provided at the end of the cylindrical housing 22 away from the rotating plate 723. The pressing portion 23b slides through the sealing member 25. The sealing member 25 effectively prevents external dust from entering the cylindrical housing 22 through the gap between the pressing portion 23b and the end of the cylindrical housing 22, and further prevents dust from entering the housing 18 through the cylindrical housing 22.

**[0040]** The embodiments of the present disclosure are described in detail above, but the content is only the optional embodiments of the present disclosure, and cannot be considered as limiting the scope of the present disclosure. All equal changes and improvements made in accordance with the scope of the present disclosure should still fall within the scope of the present disclosure.

## Claims

1. A premixed combustion device for burning a heating equipment, **characterized by** comprising:

   a housing (18);
   a combustion chamber (1) provided in the housing (18);
   a volatilization chamber (2) provided on a side of an upper portion of the combustion chamber (1) in the housing (18);
   an ignition device (3) provided at an end of the volatilization chamber (2) away from the combustion chamber (1);
   a fuel supply pipe (4) provided on a side of the volatilization chamber (2) and communicated with the volatilization chamber (2);
   an air inlet (5) provided on a side wall of the volatilization chamber (2) and located between the fuel supply pipe (4) and the ignition device (3);
   a bottom plate (6) provided outside the combustion chamber (1) and below the volatilization chamber (2); and
   a dust removing device (7) provided on the bottom plate (6) and matching with the air inlet (5);
   wherein the dust removing device (7) includes a positioning plate (710), a reset device (720) provided on the positioning plate (710), and a dust removing member (730) provided between the reset device (720) and the air inlet (5) and matching with the air inlet (5);
   the dust removing member (730) includes a supporting plate (731) vertically provided on the positioning plate (710) and parallel to the volatilization chamber (2), a dust removing pin (732) sliding through the supporting plate (731) and matching with the air inlet (5), and a positioning spring (733) provided on a side of the supporting plate (731) away from the air inlet (5) and sleeved on the dust removing pin (732); and
   one end of the positioning spring (733) is connected with the supporting plate (731), and another end of the positioning spring (733) is connected with an end of the dust removing pin (732).

2. The premixed combustion device for burning the heating equipment of claim 1, wherein the reset device (720) includes a tubular spring seat (721) provided on the positioning plate (710), a reset spring (722) provided outside the tubular spring seat (721), and a rotating plate (723) provided outside the reset spring (722); and
   the dust removing member (730) is provided between the rotating plate (723) and the air inlet (5).

3. The premixed combustion device for burning the

heating equipment of claim 2, wherein an air guiding device (8) is provided above the bottom plate (6);
the air guiding device (8) includes a first supporting column (810) vertically passing through a middle of the tubular spring seat (721) and provided on the positioning plate (710), a second supporting column (820) provided on the bottom plate (6) on another side of the volatilization chamber (2), and an air deflector (830) provided above the first supporting column (810) and the second supporting column (820) and across two sides of the volatilization chamber (2); and
an inner side of the air deflector (830) is matched with an outer wall of the combustion chamber (1), and the air deflector (830) is defined with a ventilation hole (831).

**4.** The premixed combustion device for burning the heating equipment of claim 3, wherein an air intake grille (831a) is provided at the ventilation hole (831).

**5.** The premixed combustion device for burning the heating equipment of claim 4, wherein an air filter device (9) is provided outside the combustion chamber (1) on the bottom plate (6);
the air filter device (9) includes an arc-shaped fixing plate (910) provided outside the combustion chamber (1) and a plurality of air filter plates (920) provided on the bottom plate (6) in a counterclockwise direction along the combustion chamber (1); and
each air filter plate (920) is V-shaped, and one end of each air filter plate (920) is connected with the arc-shaped fixing plate (910).

**6.** The premixed combustion device for burning the heating equipment of claim 5, wherein each air filter plate (920) includes an arc-shaped plate (921) matching with an outer side of the bottom plate (6) and a connecting plate (922) provided at one end of the arc-shaped plate (921) and connected with the arc-shaped fixing plate (910).

**7.** The premixed combustion device for burning the heating equipment of claim 6, wherein a height of the arc-shaped fixing plate (910) and a height of the air filter plate (920) are reduced in a counterclockwise direction along the combustion chamber (1).

**8.** The premixed combustion device for burning the heating equipment of claim 7, wherein the connecting plate (922) is provided with a dust suction hole (10).

**9.** The premixed combustion device for burning the heating equipment of claim 8, wherein a carbon cleaning device (11) is provided at a junction of the volatilization chamber (2) and the combustion chamber (1);
the carbon cleaning device (11) includes a cleaning member (12) provided at the junction of the volatilization chamber (2) and the combustion chamber (1), a corner plate (13) provided on a side of the rotating plate (723) close to the volatilization chamber (2), and a balance plate (14) provided on the corner plate (13) and matching with the cleaning member (12); and
the cleaning member (12) includes a fixed guide plate (15) provided outside the volatilization chamber (2), a cleaning pin (16) passing through the fixed guide plate (15) and a side wall of the volatilization chamber (2) and slidably provided at the junction of the volatilization chamber (2) and the combustion chamber (1), and a return spring (17) provided outside the volatilization chamber (2) and sleeved on the cleaning pin (16).

**10.** The premixed combustion device for burning the heating equipment of claim 9, wherein a mounting hole (19) is defined on an outer side of the housing (18) close to a free end of the rotating plate (723);
the mounting hole (19) is provided with a cleaning drive member (20) matching with the free end of the rotating plate (723);
a sealing plate (21) is provided between the cleaning drive member (20) and the housing (18),
the cleaning drive member (20) includes a cylindrical housing (22), an ejector rod (23) sliding through the cylindrical housing (22) and matching with the rotating plate (723), a reset spring (24) provided in the cylindrical housing (22) and matching with the ejector rod (23), and a sealing member (25) provided in the cylindrical housing (22);
the ejector rod (23) includes an ejector pin portion (23a) sliding through one end of the cylindrical housing (22) and matching with the rotating plate (723), a pressing portion (23b) sliding through another end of the cylindrical housing (22), and a limiting plate (23c) provided at a junction of the ejector pin portion (23a) and the pressing portion (23b) and slidingly fitted with the cylindrical housing (22);
the reset spring (24) is provided on a side of the limiting plate (23c) close to the rotating plate (723), and is sleeved on the ejector pin portion (23a);
an O-ring (26) matching with the cylindrical housing (22) is provided on an outer peripheral wall of the limiting plate (23c); and
the sealing member (25) is provided at an end of the cylindrical housing (22) away from the rotating plate (723), and the pressing portion (23b) is configured to slide through the sealing member (25).

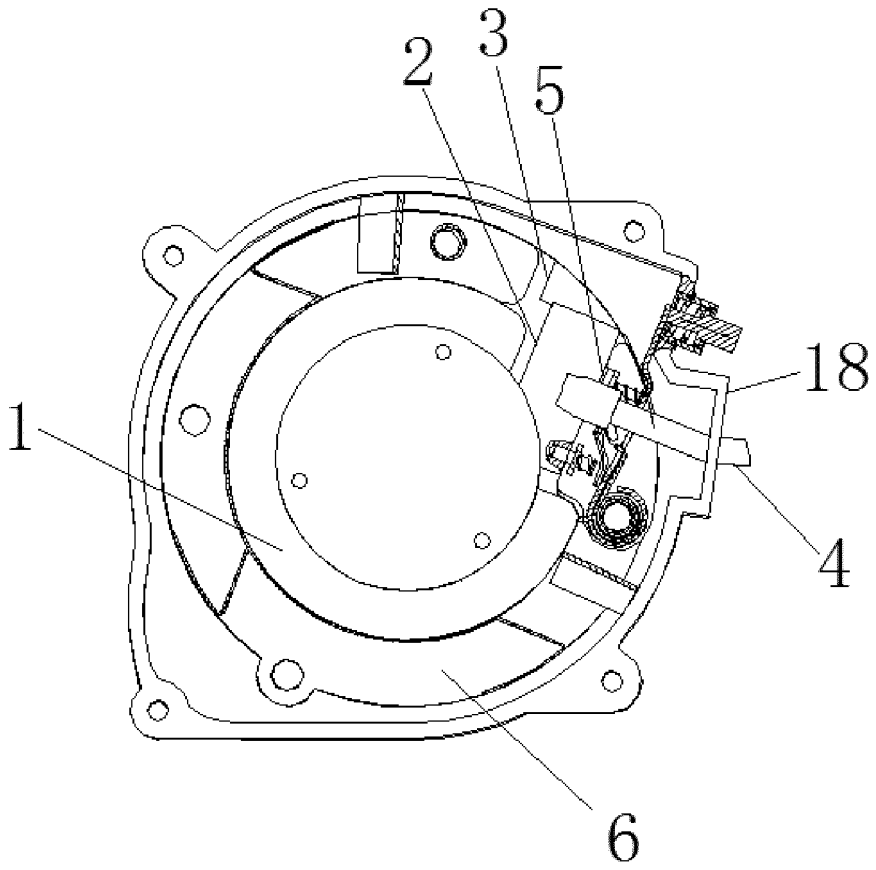


FIG. 1

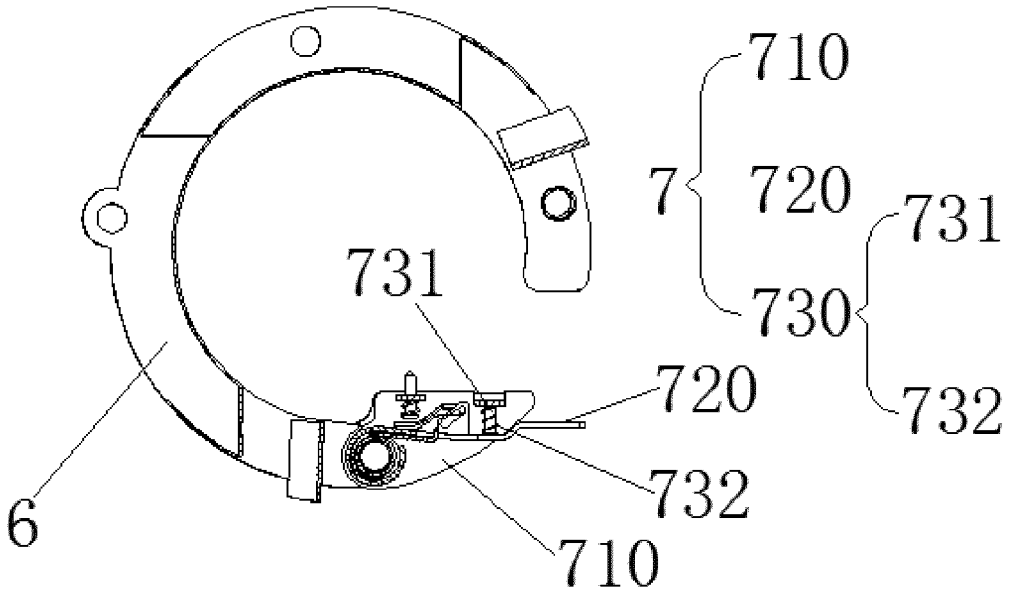


FIG. 2

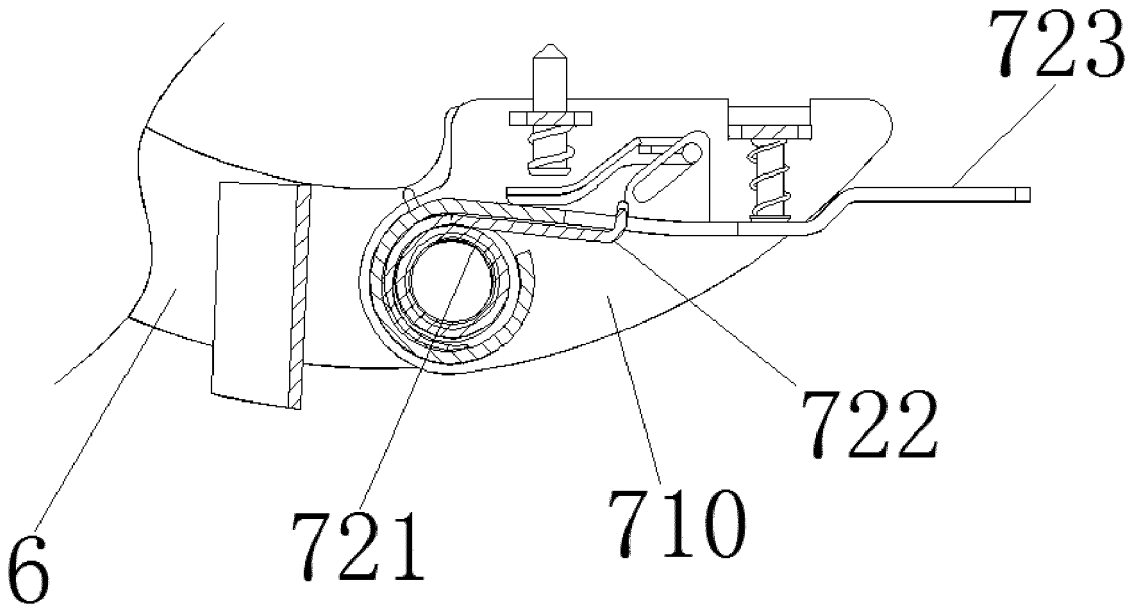


FIG. 3

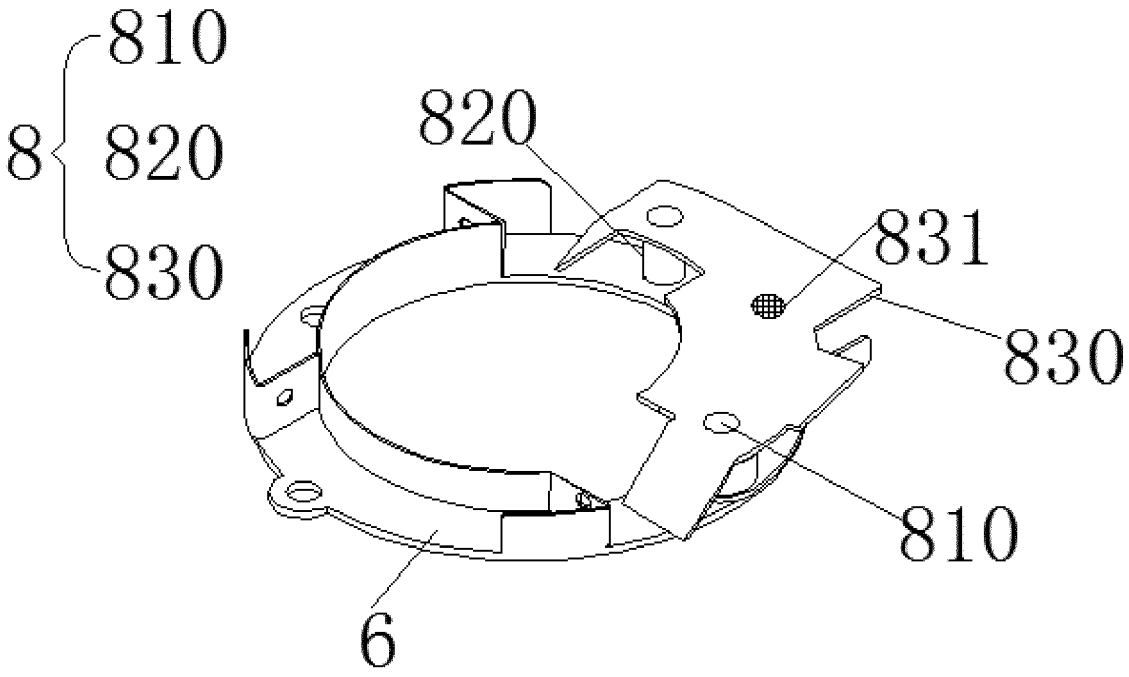


FIG. 4

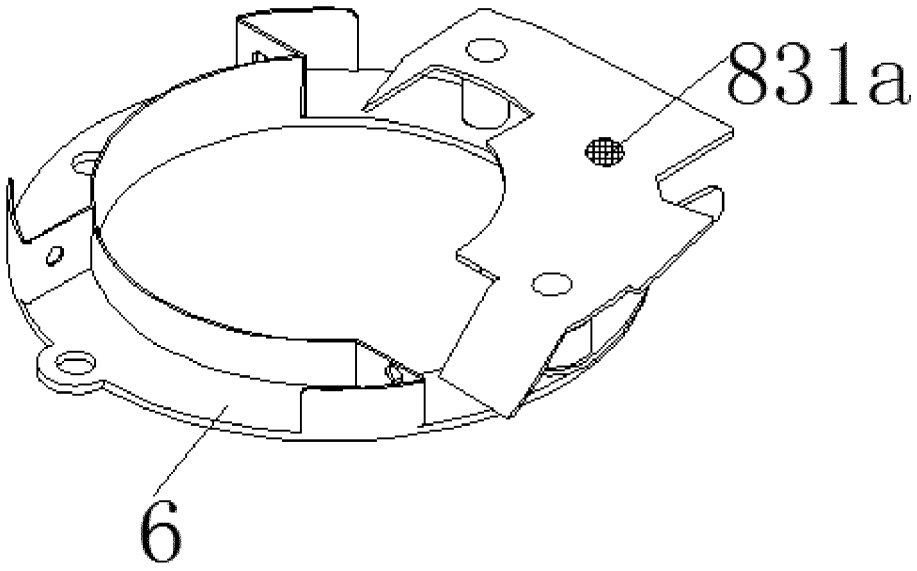


FIG. 5

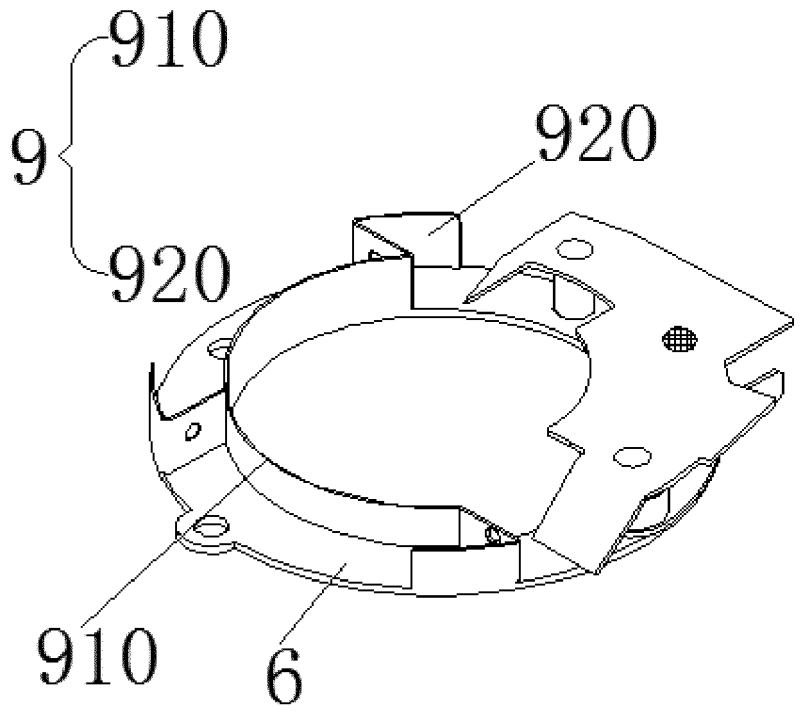


FIG. 6

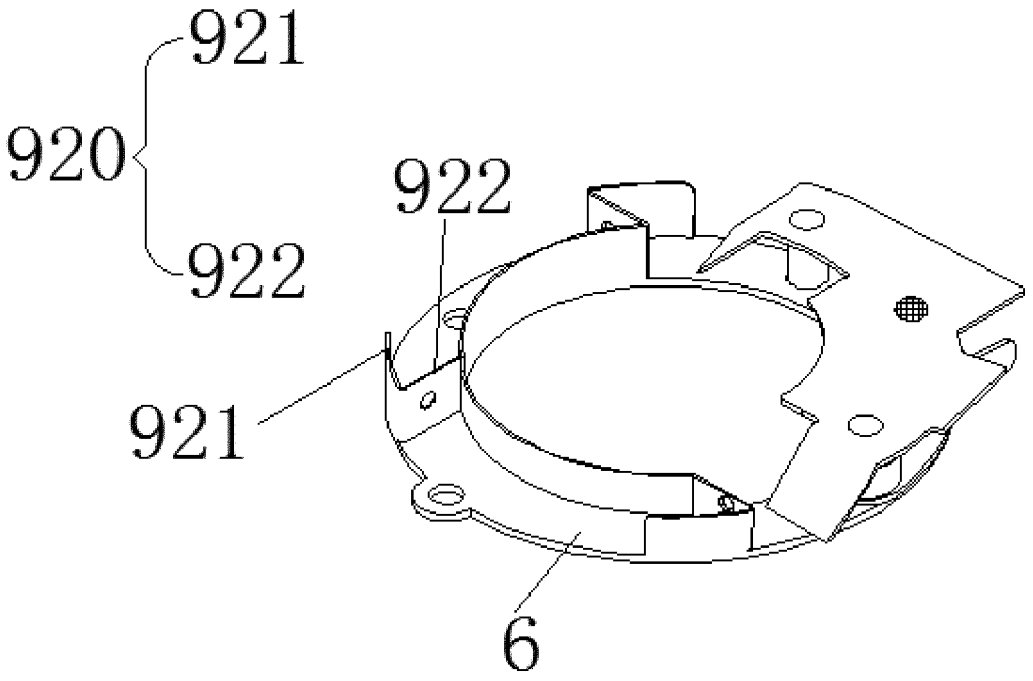


FIG. 7

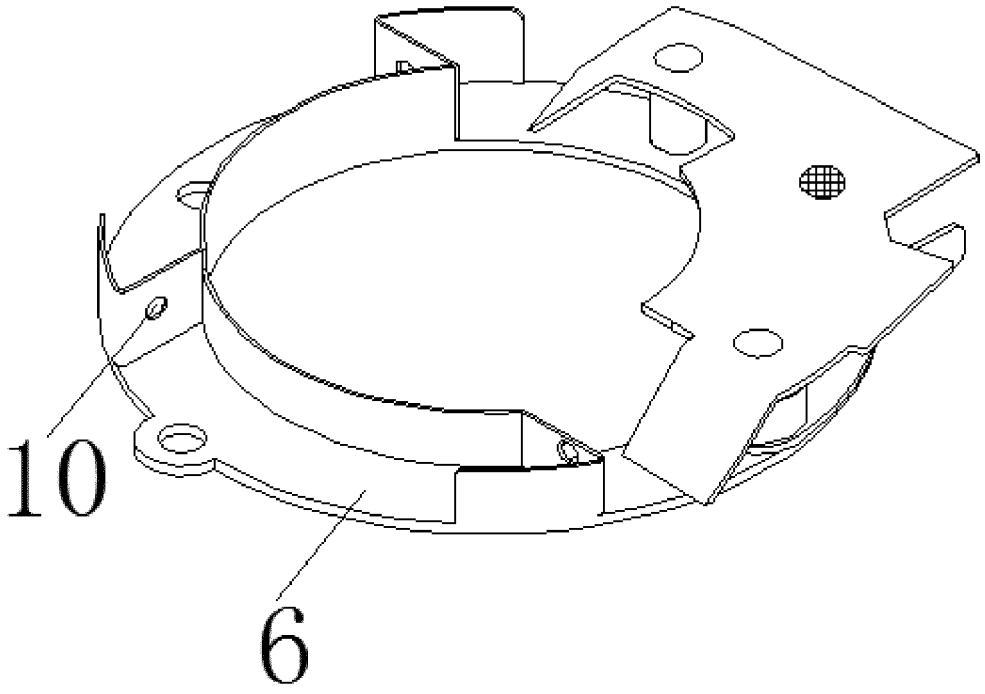


FIG. 8

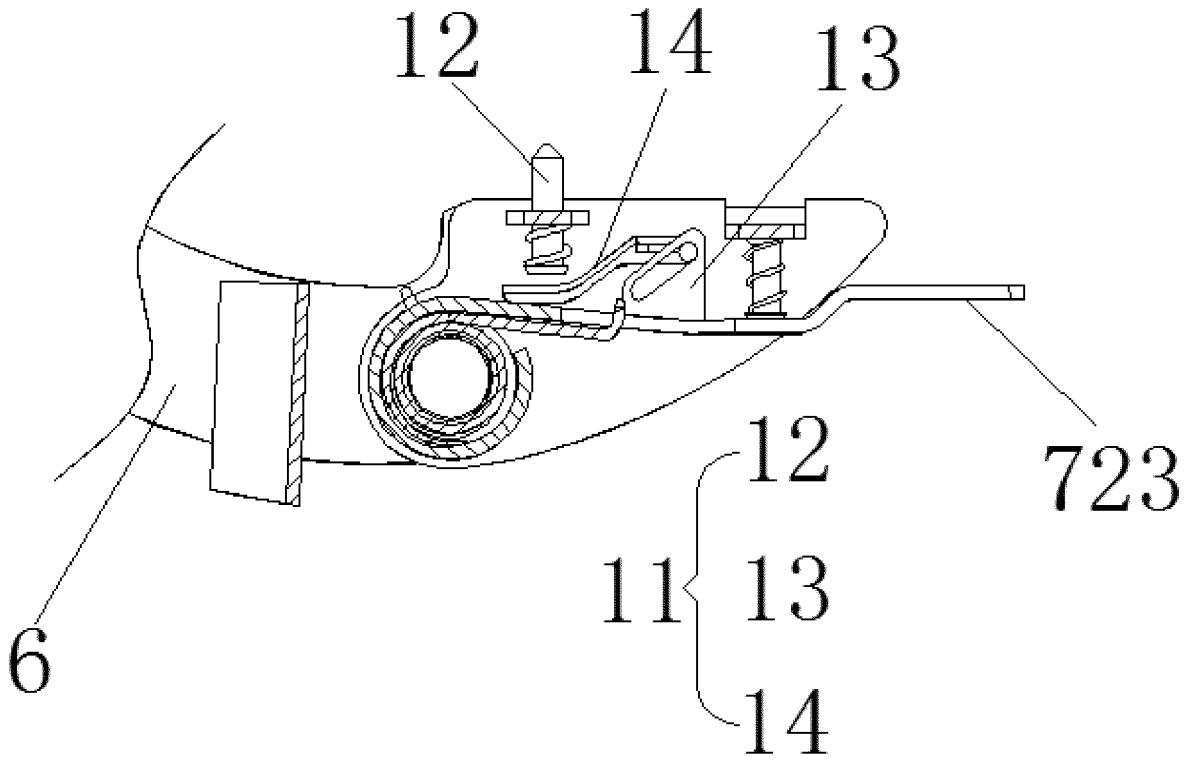


FIG. 9

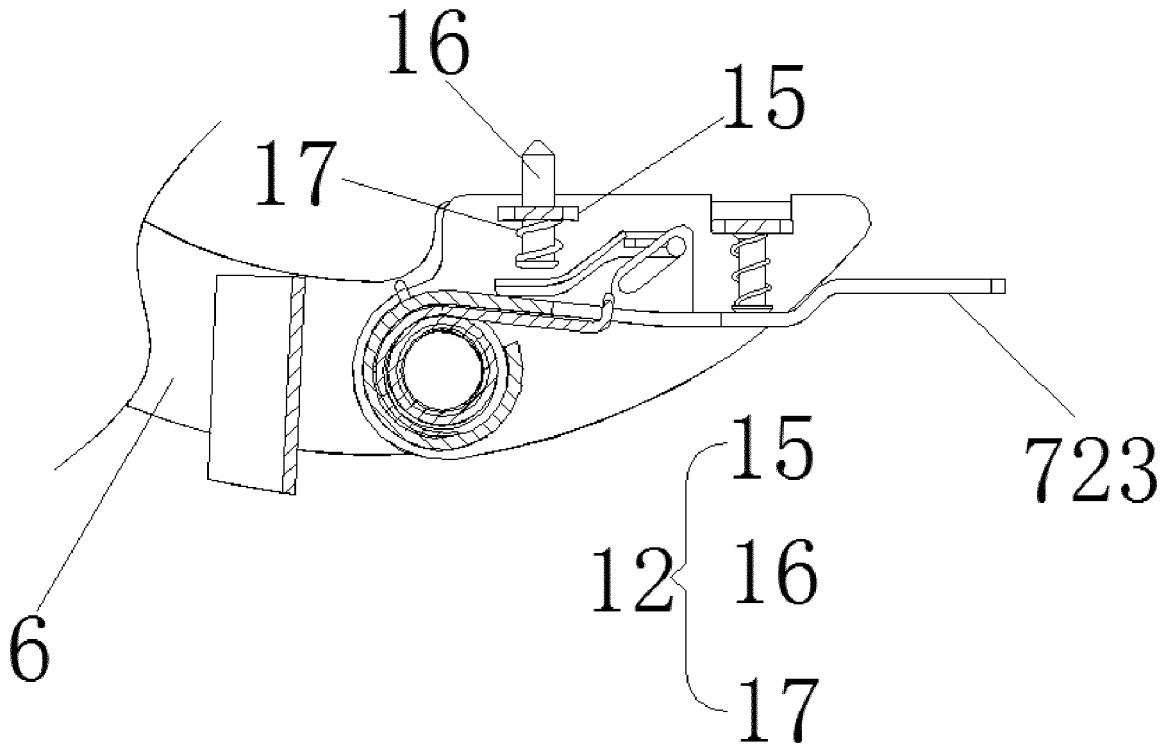


FIG. 10

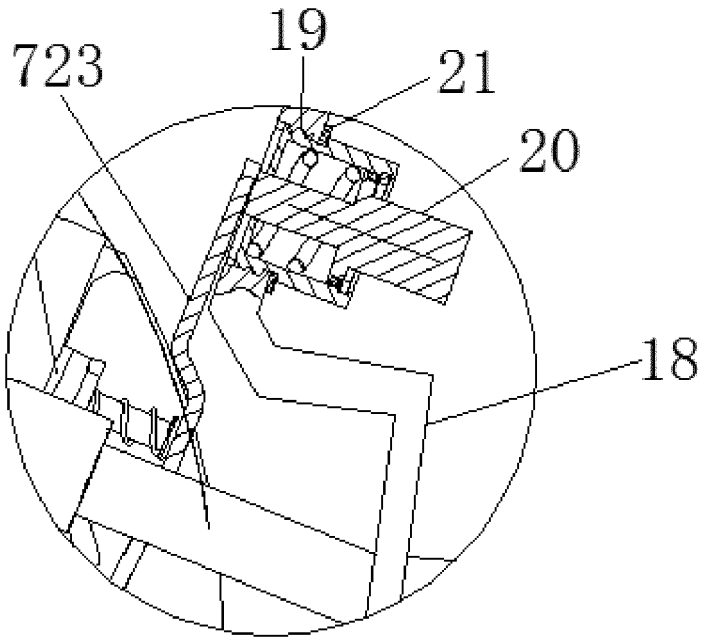


FIG. 11

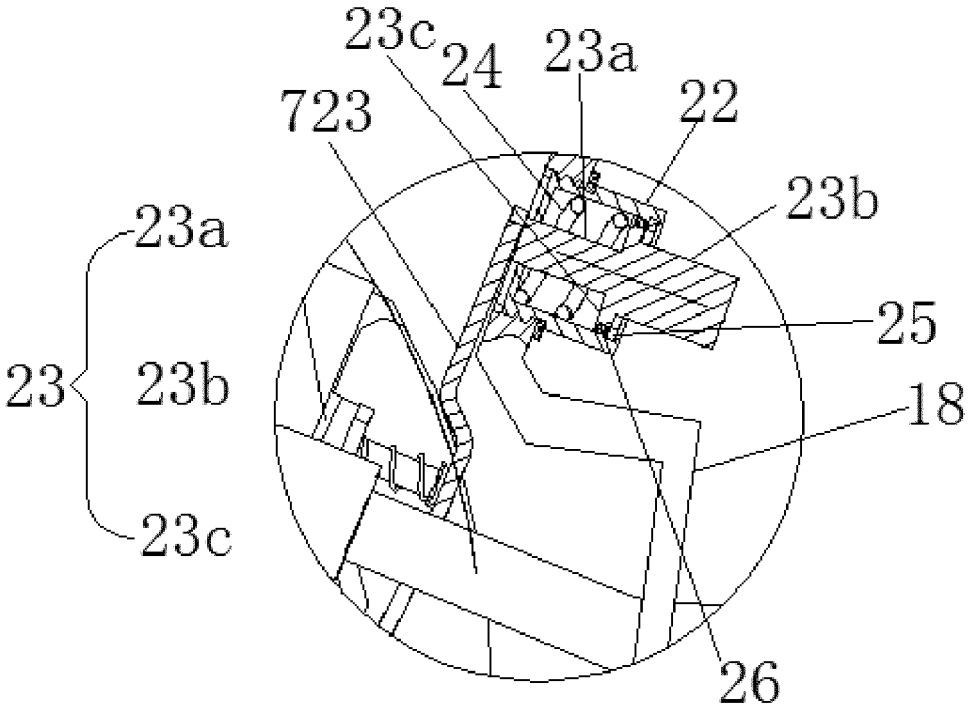


FIG. 12

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# EUROPEAN SEARCH REPORT

Application Number
EP 21 17 9764

## 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 211 345 292 U (JINGWEI AUTOMOTIVE EQUIPMENT CO LTD) 25 August 2020 (2020-08-25) * the whole document * | 1-10 | INV. F23D11/44 F23L1/02 F23L13/06 |
| X | CN 112 762 440 A (JINGWEI AUTOMOTIVE EQUIPMENT CO LTD) 7 May 2021 (2021-05-07) * the whole document * | 1-10 | |

TECHNICAL FIELDS SEARCHED (IPC)
F23D
F23L

1 The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 6 December 2021 | Gavriliu, Costin |

CATEGORY OF CITED DOCUMENTS

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D : document cited in the application
L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 21 17 9764

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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06-12-2021

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| CN 211345292 U | 25-08-2020 | NONE | |
| CN 112762440 A | 07-05-2021 | NONE | |

EPO FORM P0459

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