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(54) **PELLET BURNER WITH A ROTARY COMBUSTION CHAMBER**

PELLETBRENNER MIT EINER ROTIERENDEN VERBRENNUNGSKAMMER

BRÛLEUR À GRANULÉS AVEC UNE CHAMBRE DE COMBUSTION ROTATIVE

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Description

[0001] The subject of the invention is a pellet burner having a combustion chamber with a cover which can be applied both in households and other communal facilities objects, and store or production rooms.

[0002] Pellets and agropellets are much appreciated for their high comfort of use and therefore they are successfully used as an effective fuel for individual boilers of central heating systems, stoves, fireplaces and other heating devices designed for heating buildings and rooms, and equipped with a pellet container, a dosing device, and a feeder (conveyor). The burners designed for burning pellets, made of heat-resistant, acid-resistant, and stainless materials, are mounted in the doors of heating boilers of any type, i.e. the oil, gas or solid fuel ones.

[0003] There is known an aeration mechanism of the combustion chamber given in the Polish application description P.409186 (A1) and shown in a pellet burner presented in the drawing **Pos. 1a** and **Pos. 1b**, in addition, it relates to the burner comprising a steel body (1) which is a fixed housing with an inlet hole (2) for pellets and rotary combustion chamber (3) surrounded with a cylindrical, fixed cover, permanently connected with the body (1). In addition, a space between the combustion chamber (3) and the cover (4) is a ring-shaped duct (5) supplying air to the combustion chamber (3) throughout holes and/ or inflating nozzles (6) placed on its circumference. In this solution the rotary combustion chamber has several longitudinal diaphragms (7) having a form of shutters, swingably mounted on the outer surface of the combustion chamber and obscuring the inlet holes (6) of air, operating together with a fixed control ring (9) situated perpendicularly to the longitudinal axis of the chamber around its rear part, in addition, an inner surface of the control ring (9) functions as a cam pressing the diaphragms to the combustion chamber surface or releasing them in accordance with a sequence of the preset phases.

The combustion chamber has a form of a prism or a truncated pyramid, the base of which is a regular polygon. The diaphragms are arranged in twos on either side wall of the combustion chamber.

The inner surface (10) of the control ring (9) has a shape of arcs of two radius connected with each other by short, straight segments.

The ring-shaped duct (5) supplying air to the combustion chamber (3) is closed in front of the cover (4) by its flange ring and a sealing ring operating together with it, which is permanently connected with the outer surface of the combustion chamber (3).

[0004] A certain disadvantage of this solution consist in the fact that when the material is heated up to a very high temperature of 700 - 800° C the evident thermal expansion of the combustion chamber inside the burner occurs, which may result in some friction and seizure events, followed by a possible overloading and stopping a motor.

[0005] The patent description no. US 6203315 B1 discloses a device for the combustion of solid fuel in the form of granules, pellets, chips or other fragmented or finely divided form, which is presented in the drawing marked as Pos. 2. This device comprises a rotary reactor drum (1), which forms the main combustion chamber (13) and has a rear end wall (65) and at the opposite end an outlet (3) for combustion gases to a boiler part for heat transfer to water-cooled surfaces, for example, or other heat-absorbing means, an inlet (55) for combustion air to the main combustion chamber (13), means (40) for feeding fuel through the rear and wall (65) of the reactor drum and means for rotating the reactor drum around its center axis (2). Inside the main combustion chamber (13), in its rear part, is an inner, smaller drum (60), which is coaxial with the reactor drum (1) and has a perforated jacket. At least the bulk of the fuel is disposed to be fed into the inner, smaller drum (60) and from this to the surrounding main combustion chamber (13). The smaller drum (60) is disposed to be rotatable with the larger reactor drum (1) around its center axis (2).

[0006] The subject of the invention is a pellet burner having a housing with an inlet hole for pellets and a rotary combustion chamber surrounded by a cylindrical cover connected with the housing, in addition, a space between the combustion chamber and the cover is a ring-shaped duct supplying air to the combustion chamber throughout inlet holes and/or nozzles located on its circumference, the ring-shaped duct supplying air to the combustion chamber is closed in front of the cover by its flange ring, directed towards the inside, and a sealing ring operating together with it, permanently connected with the outer surface of the combustion chamber. According to the model, a rear part of the cover is permanently connected with a compensatory plate, a surface of which is perpendicular to the longitudinal axis of the cover, in addition, the compensatory plate is elastically connected with a seat of the burner housing. It is advantageous that the compensatory plate has mandrels, which are slidably mounted in holes of the burner housing seat and they are ended with heads. There are compensatory springs placed on these mandrels.

[0007] Thanks to the solution according to the invention, a simple solution improving the work of the pellet burner has been developed, especially useful in case of burners equipped with a rotary combustion chamber - preventing formation of thermal stresses, seizures, and friction during the burner's operation.

[0008] The subject of the invention presented in an exemplary embodiment is shown in a schematic drawing, Fig. 1 of which is a side view of the pellet burner; Fig. 2 shows a side view of the combustion chamber cover; Fig. 3 shows a longitudinal section of the combustion chamber cover; Fig. 5 shows a front part with a partial perspective view of the pellet burner; Fig. 6 shows a detail of the elastically mounted cover in the burner's off-position; Fig. 7 shows a detail of the elastically mounted cover in the burner's on-position.

[0009] A cover of the combustion chamber in a pellet burner according to the invention, is designed for a burner comprising a housing 1 with an inlet hole for pellets 2 and a rotary combustion chamber 3 surrounded by a cylindrical cover 4 connected to the housing 1, in addition, a space between the combustion chamber 3 and the cover 4 is a ring-shaped duct 5 supplying air to the inside of the combustion chamber 3 throughout inlet holes and/or nozzles placed on its circumference (not shown in the drawing).

The ring-shaped duct 5 supplying air to the combustion chamber 3 is closed in front of the cover 4 with its flange ring 6 directed towards inside of the chamber and operating together with a sealing ring 7 permanently connected with the outer surface of the combustion chamber 3. A rear part of the cover 4 is permanently connected with the compensatory plate 9 the surface of which is perpendicular to the longitudinal axis of the cover, whereas the compensatory plate 9 is elastically connected with the housing seat 10 of the burner housing 1. For ensuring an elastic connection the compensatory plate 9 is provided with mandrels 11 slidably mounted in holes 12 of the seat 10 of the burner housing 1 and ended with heads 13. There are compensatory springs 14 placed (supported) on these mandrels 11.

[0010] As a result of such mounting, the cover 4 can move along the axis in a reciprocating motion. When the temperature reaches the value of 700° C during the pellet burner's operation, the combustion chamber 3 is subject to the action of deforming forces which cause the thermal expansion of the chamber. The combustion chamber 3 expands and the sealing ring 7 placed on its circumference presses on the ring-shaped flange 6 of the cover 4 making it move forwards. The thermal contraction of the combustion chamber 3 during the cooling-down process makes the sealing ring 7 move backwards which - releasing pressure in the ring-shaped flange 6 - makes the movement of the cover 4 backwards possible due to the action of the compensatory springs 14.

Claims

1. A pellet burner having a burner housing (1) with an inlet hole (2) for pellets and a rotary combustion chamber (3) surrounded with a cylindrical cover (4), connected with the burner housing (1), in addition, a space between the combustion chamber (3) and the cylindrical cover (4) is a ring-shaped duct (5) supplying air to the combustion chamber (3) throughout holes and/or nozzles placed on its circumference, and the ring-shaped duct (5) supplying air to the combustion chamber (3) is closed in front by a flange ring (6) directed inwards the combustion chamber (3) **characterised in that** a sealing ring (7) operates together with the flange ring (6) and is permanently connected with the outer surface of the combustion chamber (3), and **in that** a rear part (8) of the cylin-

drical cover (4) is permanently connected with a compensatory plate (9), a surface of which is perpendicular to a longitudinal axis of the cylindrical cover (4), whereas the compensatory plate (9) is elastically connected with the burner housing (1).

2. The pellet burner according to claim 1, **characterised in that** the compensatory plate (9) has mandrels (11) slidably fitted in the holes (12) of a seat (10) of the burner housing (1) and ended with heads (13) and supporting compensatory springs (14).

Patentansprüche

1. Pelletbrenner mit einem Brennergehäuse (1) mit einer Einlauföffnung (2) für Pellets und einer Rotationsbrennkammer (3), der von einer mit dem Brennergehäuse (1) verbundenen zylindrischen Schutzabdeckung (4) umgeben ist; außerdem ist der Raum zwischen der Brennkammer (3) und der zylindrischen Schutzabdeckung (4) als ein Kanal in Form eines Ringes (5) ausgebildet, der die Luft zur Brennkammer (3) durch die an ihrem Umfang angeordneten Öffnungen und/oder Düsen zuführt, während die ringförmige Leitung (5), die die Luft zur Brennkammer (3) zuführt, vorne mit einem zur Innenseite der Brennkammer (3) hin gerichteten Flanschring (6) verschlossen ist, **dadurch gekennzeichnet, dass** der Dichtungsring (7) mit dem Flanschring (6) zusammenwirkt und dauerhaft mit der Außenfläche der Brennkammer (3) verbunden ist und dass der hintere Teil (8) der zylindrischen Abdeckung (4) dauerhaft mit einer Ausgleichsplatte (9) verbunden ist, deren Oberfläche senkrecht zur Längsachse der zylindrischen Schutzabdeckung (4) angeordnet ist, während die Ausgleichsplatte (9) elastisch mit dem Brennergehäuse (1) verbunden ist.
2. Pelletbrenner nach Anspruch 1, **dadurch gekennzeichnet, dass** die Ausgleichsplatte (9) Bolzen (11) aufweist, die verschiebbar in den Öffnungen (12) der Aufnahme (10) des Brennergehäuses (1) angeordnet sind und mit Köpfen (13) abgeschlossen sind, die die Ausgleichsfedern (14) aufnehmen.

Revendications

1. Brûleur à pellets avec boîtier du brûleur (1) avec un orifice d'entrée (2) des pellets et une chambre de combustion rotative (3), entouré d'un couvercle cylindrique (4), relié au boîtier du brûleur (1), en plus, l'espace entre la chambre de combustion (3) et le couvercle cylindrique (4) est un conduit annulaire (5) qui alimente la chambre de combustion (3) en air par des fentes et/ou buses se trouvant sur sa circonférence, tandis que le conduit annulaire (5) qui alimen-

te la chambre de combustion (3) en air est fermé par devant par une bride circulaire (6) orientée vers l'intérieur de la chambre de combustion (3) **qui se caractérise en ce que** un anneau d'étanchéité (7) fonctionne avec la bride circulaire (6) et il est relié de manière fixe à la surface extérieure de la chambre de combustion (3) et **en ce que** la partie arrière (8) du couvercle cylindrique (4) est reliée de manière fixe à la plaque compensatoire (9) dont la surface est perpendiculaire à l'axe longitudinal du couvercle cylindrique (4), tandis que la plaque compensatoire (9) est élastiquement liée au boîtier du brûleur (1).

2. Brûleur à pellets selon la revendication 1, **qui se caractérise en ce que** la plaque de compensation (9) est dotée de mandrins (11) montés coulissant dans les orifices (12) du siège (10) du boîtier du brûleur (1) et finis par des chapes (13) soutenant des ressorts compensatoires (14).

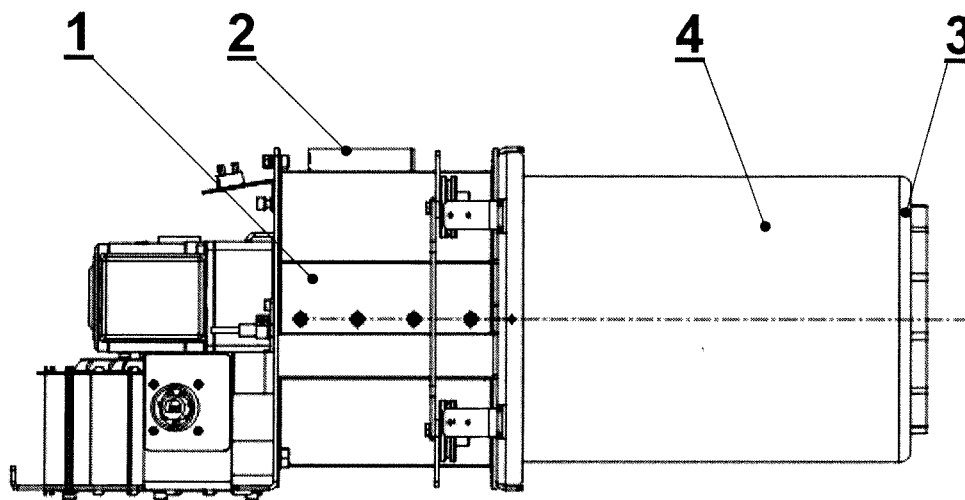


Fig. 1

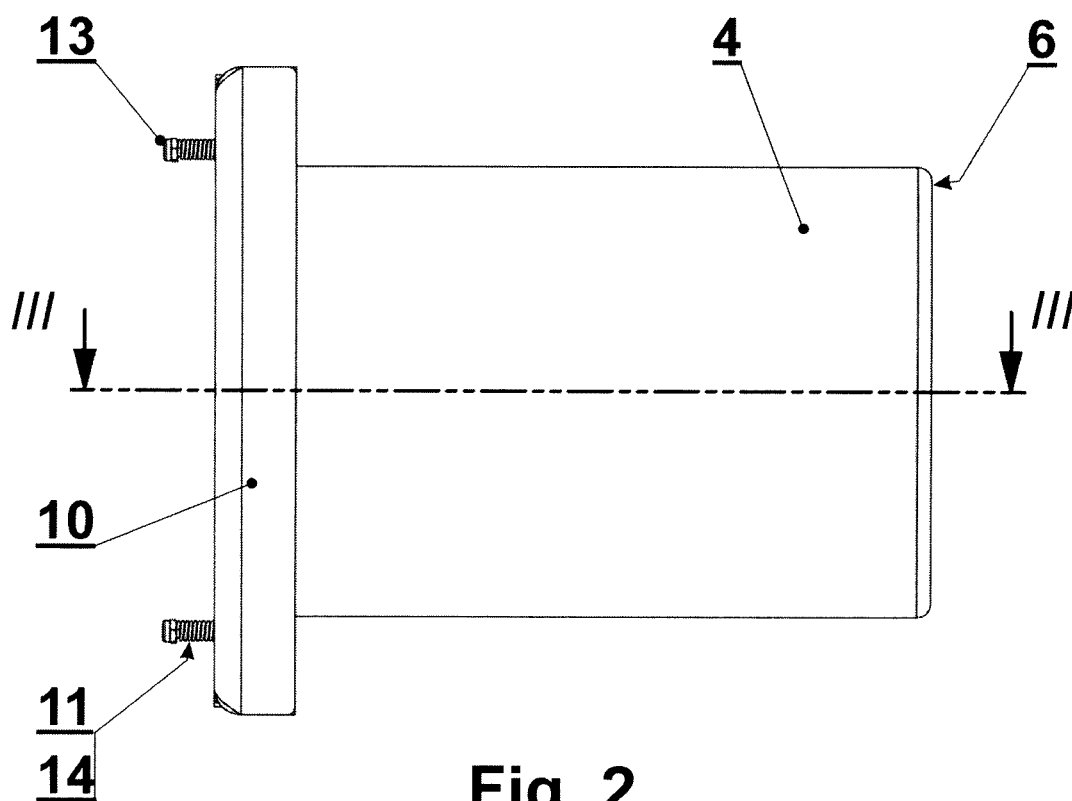


Fig. 2

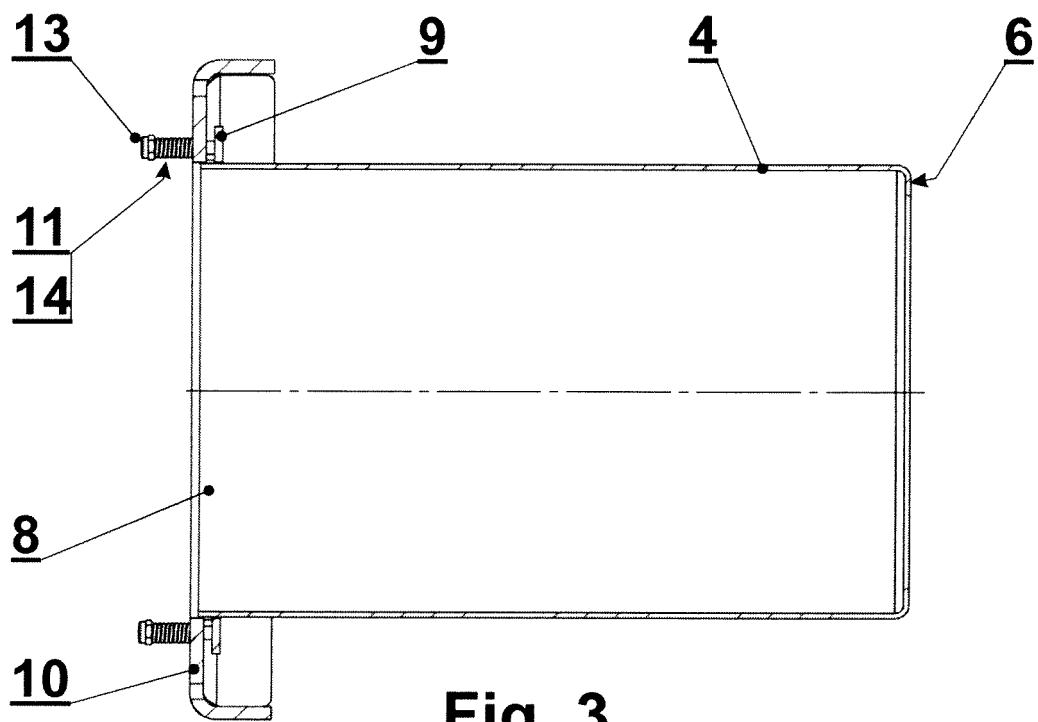


Fig. 3

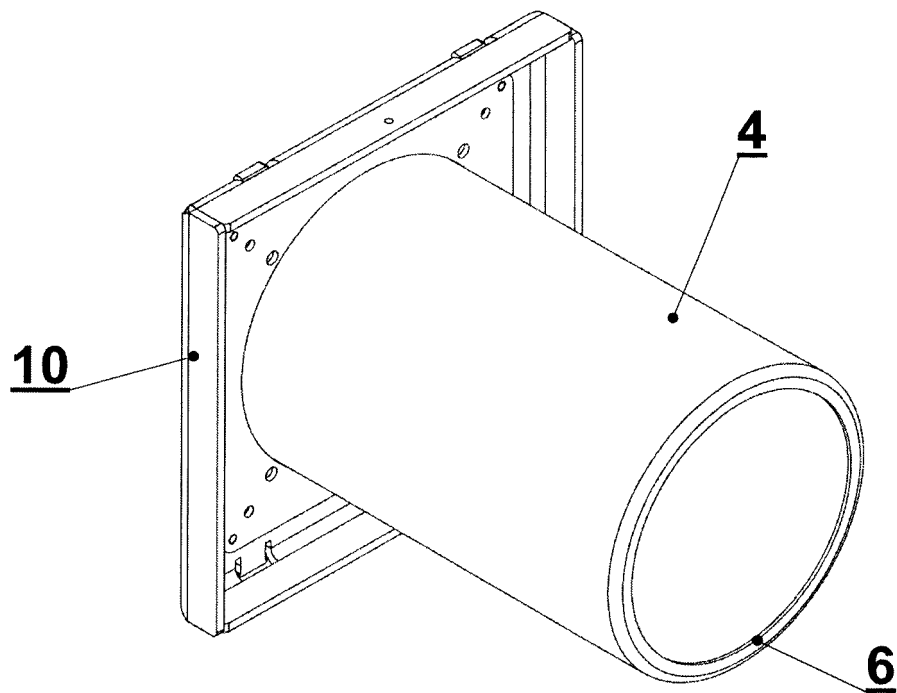


Fig. 4

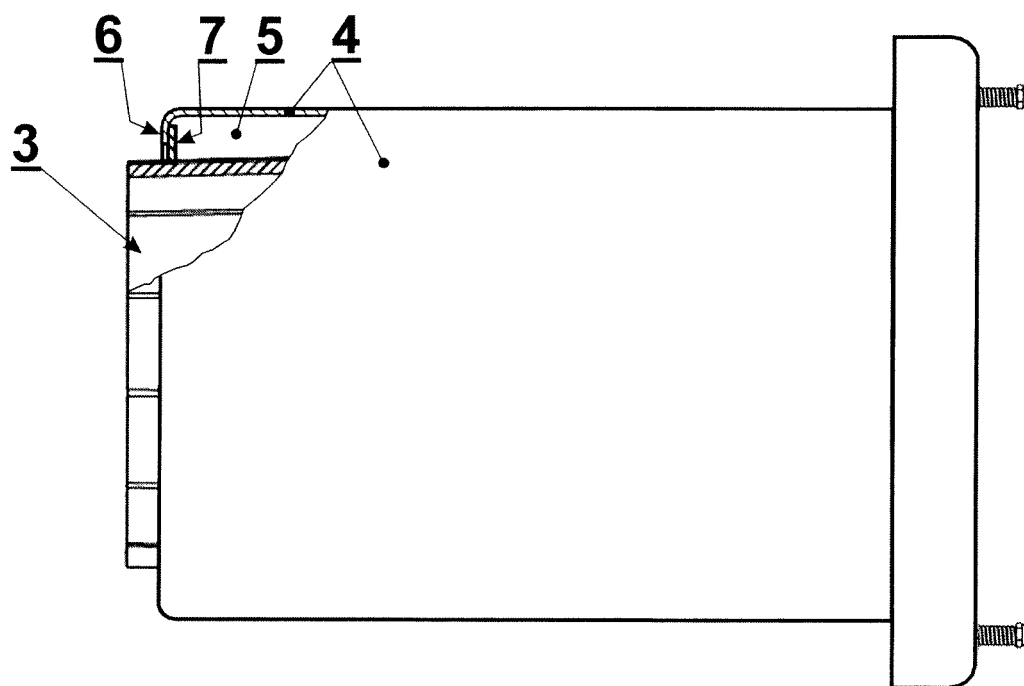


Fig. 5

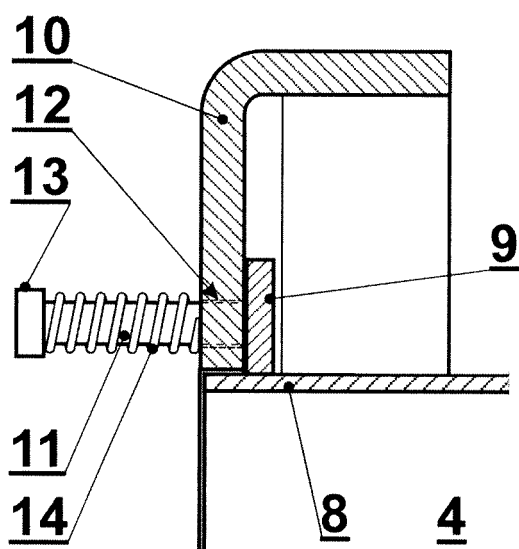


Fig. 6

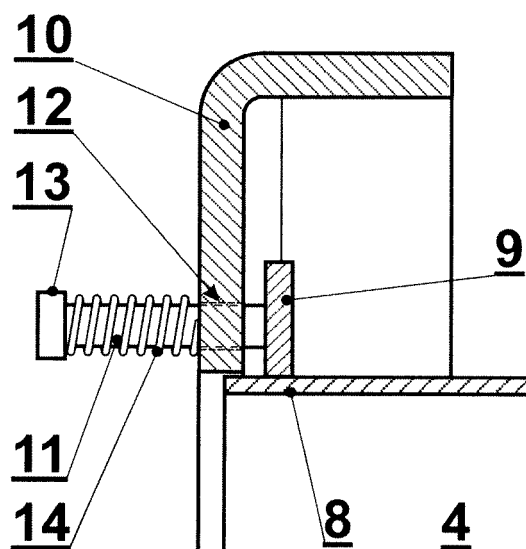
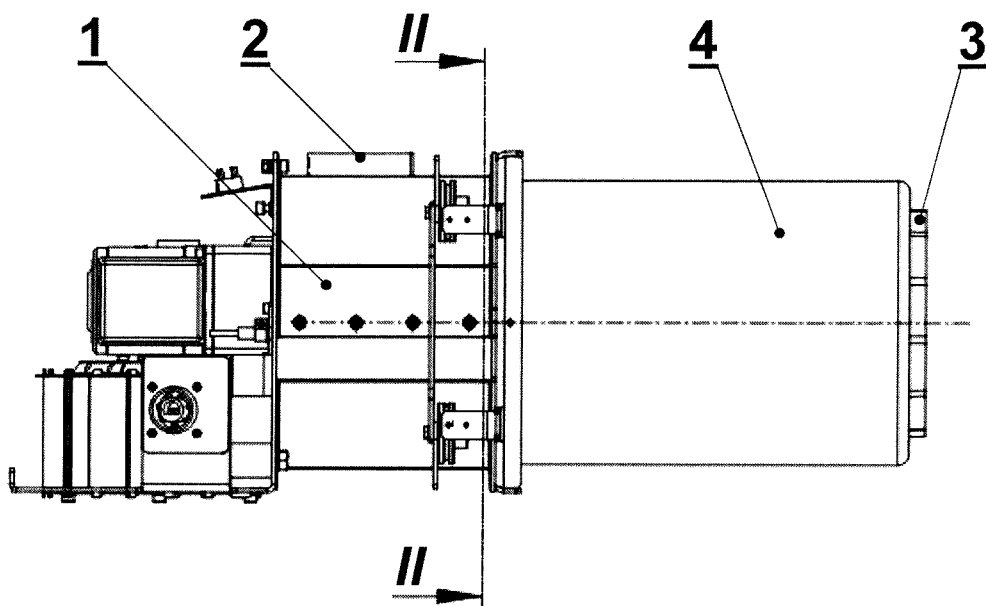
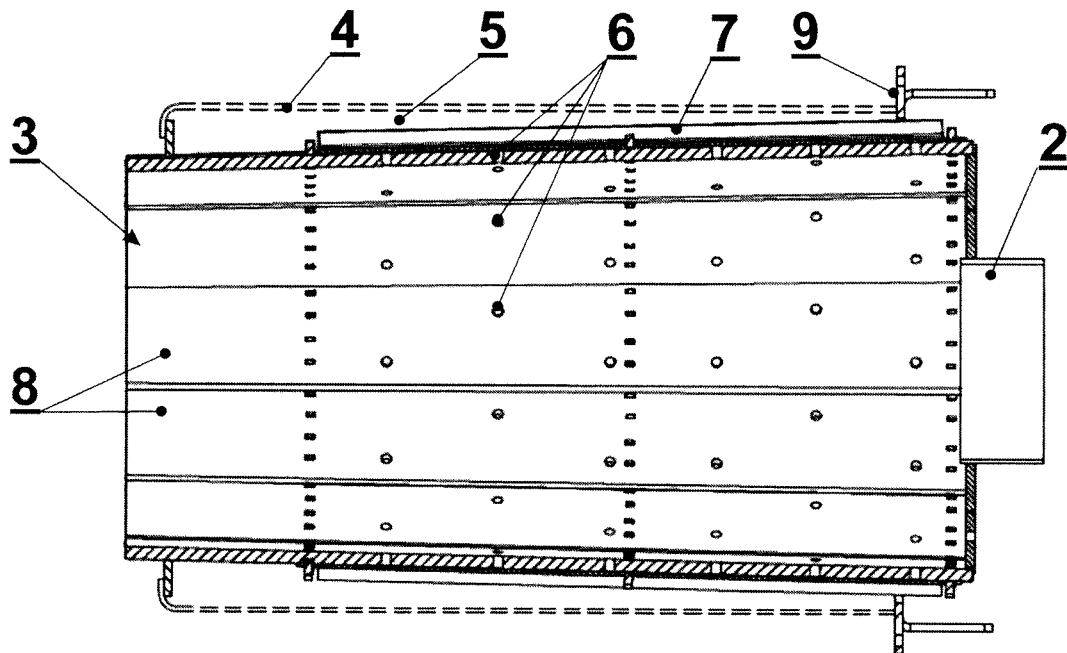


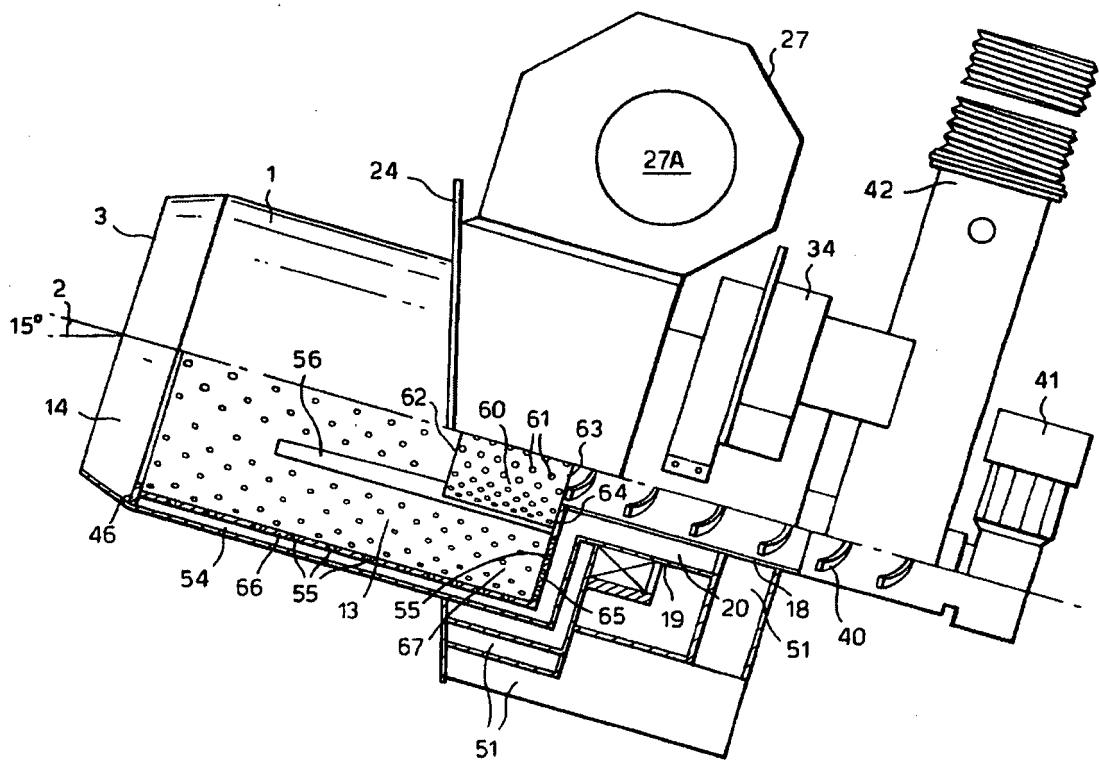
Fig. 7



Pos. 1a (Prior Art)



Pos. 1b (Prior Art)



Pos. 2 (Prior Art)

REFERENCES CITED IN THE DESCRIPTION

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