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(54) **SHAPED BURNER PIECE WITH INTERNAL FLUE GAS RECIRCULATION**

(57) Burner shape piece (1) which comprises an inlet gas-air diffuser (2) and in front of it at an axial distance an outlet gas-air-flue diffuser (3) is arranged, wherein the diffusers (2, 3) are connected together by four regularly spaced ribs (8) arranged around the inner circumference of the burner shaped piece (1) and the gas-air diffuser (2) has a hollow conical taper (4) terminated by a cylindrical flow-direction regulator (6), wherein the gas-air-flue diffuser (3) has a hollow conical taper (5) terminated by a cylindrical flow-direction regulator (7), wherein the gas-air-flue diffuser (3) has a larger diameter as at the beginning and so at the end of its taper (5) than the diameter at the beginning and at the end of the taper (4) of the gas-air diffuser (2), and in the spaces between the outer surface of the gas-air diffuser (2) and the inner face (13) of the gas-air-flue diffuser (3) and the inner surface of the taper (5), four evenly spaced flue gas channels (11) are formed around the peripheral shell of the burner shaped piece (1) with the inlets for fuel gas (B) and on the outer circumference of the burner shaped piece (1) groove-shaped channels (9) are formed along its entire length and are recessed into each rib (8).

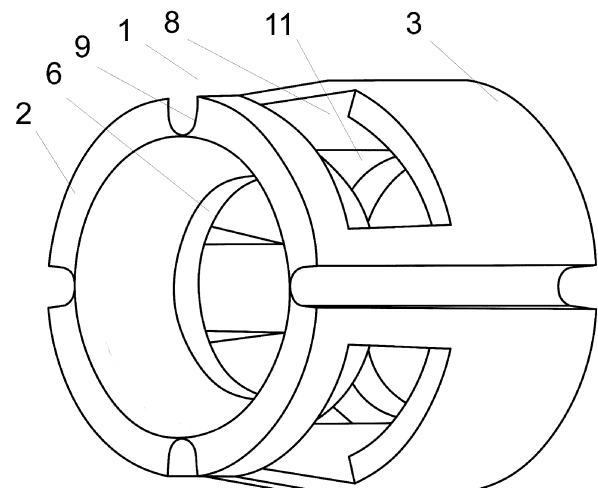


Fig. 3

Description

Technical field

[0001] The invention relates to a burner shaped piece for monobloc burners for water heating and steam generation with low nitrogen oxide emissions.

State of the art

[0002] In large power plants such as power stations, refineries or chemical plants, power burners with burner shaped pieces are used. In field of water heating or steam generation, monobloc burners with compact design are commonly used, and no concrete elements are used. Currently, there is an effort to design burners with nitrogen oxide emissions as low as possible. Lessons learned from the design of shaped pieces for power burners could be used by design of a burner shaped piece suitable for reduction of NOx emissions with use of flue gas recirculation.

[0003] The aim of the invention is to introduce a burner shaped piece with internal flue gas recirculation adapted to the compact dimensions of monobloc natural gas burners.

Summary of the invention

[0004] The above mentioned shortcomings are eliminated by a burner shaped piece with internal flue gas recirculation according to the invention, the substance of which is that it comprises an inlet gas-air diffuser and in front of it at an axial distance an outlet gas-air-flue diffuser is arranged, wherein the diffusers are connected together by four regularly spaced ribs arranged around the inner circumference of the burner shaped piece and the gas-air diffuser has a hollow conical taper terminated by a cylindrical flow-direction regulator, wherein the gas-air-flue diffuser has a hollow conical taper terminated by a cylindrical flow-direction regulator, wherein the gas-air-flue diffuser has a larger diameter as at the beginning and so at the end of its taper than the diameter at the beginning and at the end of the taper of the gas-air diffuser, and in the spaces between the outer surface of the gas-air diffuser and the inner face of the gas-air-flue diffuser and the inner surface of the taper, four evenly spaced flue gas channels are formed around the peripheral shell of the burner shaped piece with the inlets for fuel gas and on the outer circumference of the burner shaped piece groove-shaped channels are formed along its entire length and are recessed into each rib.

[0005] In preferred embodiment the gas-air diffuser (2) has a cylindrical surface (12) on the outer circumference provided with a set-up opening (10) for adjusting a not-shown monobloc burner having an axis perpendicular to the axis of the gas-air diffuser (2).

Brief description of drawings

[0006] The invention will be further explained by use of drawings, in which Fig. 1 is a front view of an outlet of a burner shaped piece according to the invention, Fig. 2 is a section through the burner shaped piece along the Z-Z line of Fig. 1, Fig. 3 is a perspective view of an inlet of the burner shaped piece, Fig. 4 is a perspective view of an outlet of the burner shaped piece and Fig. 5 is a perspective view of the burner shaped piece from aside.

Description of preferred embodiments

[0007] Fig. 1 is a front view of the outlet of a rotationally symmetrical burner shaped piece 1 according to the invention. Only edges of the flow-direction regulators 6 and 7 of diffusers 2 and 3, respectively, and further, four circumferentially uniformly spaced channels 9 for the installation of the secondary gas nozzles can be seen.

[0008] Fig. 2 is an axial section of the burner shaped piece 1 along the Z-Z line of Fig. 1. It can be seen that it consists of a gas-air diffuser 2 at the inlet and a gas-air-flue diffuser 3 at the outlet. Diffusers 2 and 3 are arranged spaced apart from each other and are connected together by four ribs 8 regularly spaced along the inner circumference of the shaped piece 1. The gas-air diffuser 2 has a hollow conical taper 4 and a cylindrical surface 12 on its outer circumference. The conical taper 4 is terminated by a cylindrical flow-direction regulator 6. The diffuser 2 is provided with a set-up opening 10 on said cylindrical surface 12 for adjusting an monobloc burner (not shown). This opening 10 has an axis perpendicular to the axis of the diffuser 2. The gas-air-flue diffuser 3 has a hollow conical taper 5 terminating in a cylindrical flow-direction regulator 7. The gas-air-flue diffuser 3 has a larger diameter as at the beginning and so at the end of its taper 5 than the diameter at the beginning and at the end of the taper 4 of the gas-air diffuser 2, because a larger amount of the mixture of fuel-air and flue gas B flows through it, than it is the case of the gas-air diffuser 2, where only fuel-air mixture A flows. In the spaces between the outer surface of the diffuser 2 and the inner face 13 of the diffuser 3 and the inner surface of the taper 5, four evenly spaced flue gas channels 11 with four inlets for flue gas B are formed around the peripheral shell of the burner shaped piece 1.

[0009] The gas-air mixture A is accelerated in the gas-air diffuser 2 and a vacuum is created, thereby ensuring the suction of the flue gas B through the flue gas channel 11, as shown by the arrow, where the flue gas B arrives at the periphery of the burner shaped piece 1 directly from the combustion chamber.

[0010] On the outer circumference of the burner shaped piece 1, groove-shaped channels 9 are formed along its entire length and are recessed into each rib 8. Into these channels 9 secondary nozzles (not shown) of gas burner are installed. The ribs 8 are important for reinforcement of the entire burner shaped piece 1 and their

thickness is also one of the factors which affects the amount of flue gas B sucked through the channel 11.

[0011] Fig. 3 is a perspective view of the inlet of burner shaped piece 1 and illustrates the inlets of flue gas channels 11 for flue gas B. The symmetrically arranged channels 9 for the installation of the secondary nozzles can also be seen here, and the inner surface of the flow-direction regulator 6 of the gas diffuser 2 can be seen inside the burner shaped piece 1.

[0012] Fig. 4 is a perspective view of the outlet of burner shaped piece 1. The inner surface of the flow-direction regulator 7 of the gas-flue diffuser 3 and the inlets of the flue gas channels 11 can be seen.

[0013] Fig. 5 is a perspective view of the burner shaped piece 1 from aside. The flue channel 11 and the shape of the ribs 8 are illustrated.

[0014] List of reference signs

A -	gas-air mixture	
B -	flue gas	20
1 -	burner shaped piece	
2 -	gas-air diffuser	
3 -	gas-air-flue diffuser	
4 -	taper of the gas-air diffuser	
5 -	taper of the gas-air flue diffuser	25
6 -	gas-air diffuser flow-direction regulator	
7 -	flow-direction regulator for gas-air-flue diffuser	
8 -	ribs	
9 -	channel for installation of secondary nozzle	
10 -	set-up opening	30
11 -	flue gas channel	
12 -	cylindrical surface of the gas diffuser	
13 -	inner face of the gas-air-diffuser	

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Claims

1. Burner shape piece with cylindrical shape, **characterized in that** it comprises an inlet gas-air diffuser (2) and in front of it at an axial distance an outlet gas-air-flue diffuser (3) is arranged, wherein the diffusers (2, 3) are connected together by four regularly spaced ribs (8) arranged around the inner circumference of the burner shaped piece (1) and the gas-air diffuser (2) has a hollow conical taper (4) terminated by a cylindrical flow-direction regulator (6), wherein the gas-air-flue diffuser (3) has a hollow conical taper (5) terminated by a cylindrical flow-direction regulator (7), wherein the gas-air-flue diffuser (3) has a larger diameter as at the beginning and so at the end of its taper (5) than the diameter at the beginning and at the end of the taper (4) of the gas-air diffuser (2), and in the spaces between the outer surface of the gas-air diffuser (2) and the inner face (13) of the gas-air-flue diffuser (3) and the inner surface of the taper (5), four evenly spaced flue gas channels (11) are formed around the peripheral shell of the burner shaped piece (1) with the inlets for fuel

gas (B) and on the outer circumference of the burner shaped piece (1) groove-shaped channels (9) are formed along its entire length and are recessed into each rib (8).

2. Burner shape piece according to claim 1, **characterized in that** the gas-air diffuser (2) has a cylindrical surface (12) on the outer circumference provided with a set-up opening (10) for adjusting a not-shown monobloc burner having an axis perpendicular to the axis of the gas-air diffuser (2).

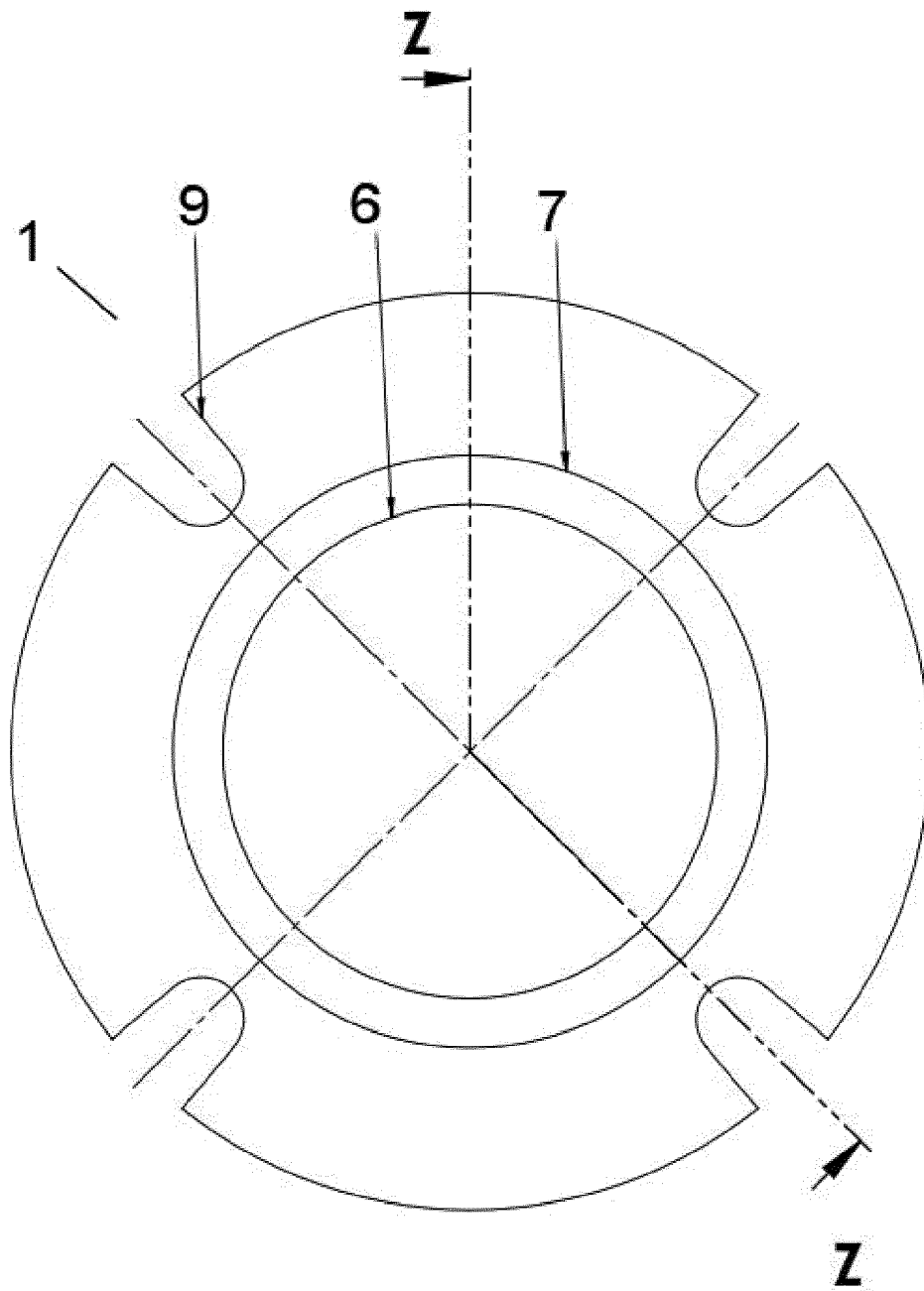


Fig. 1

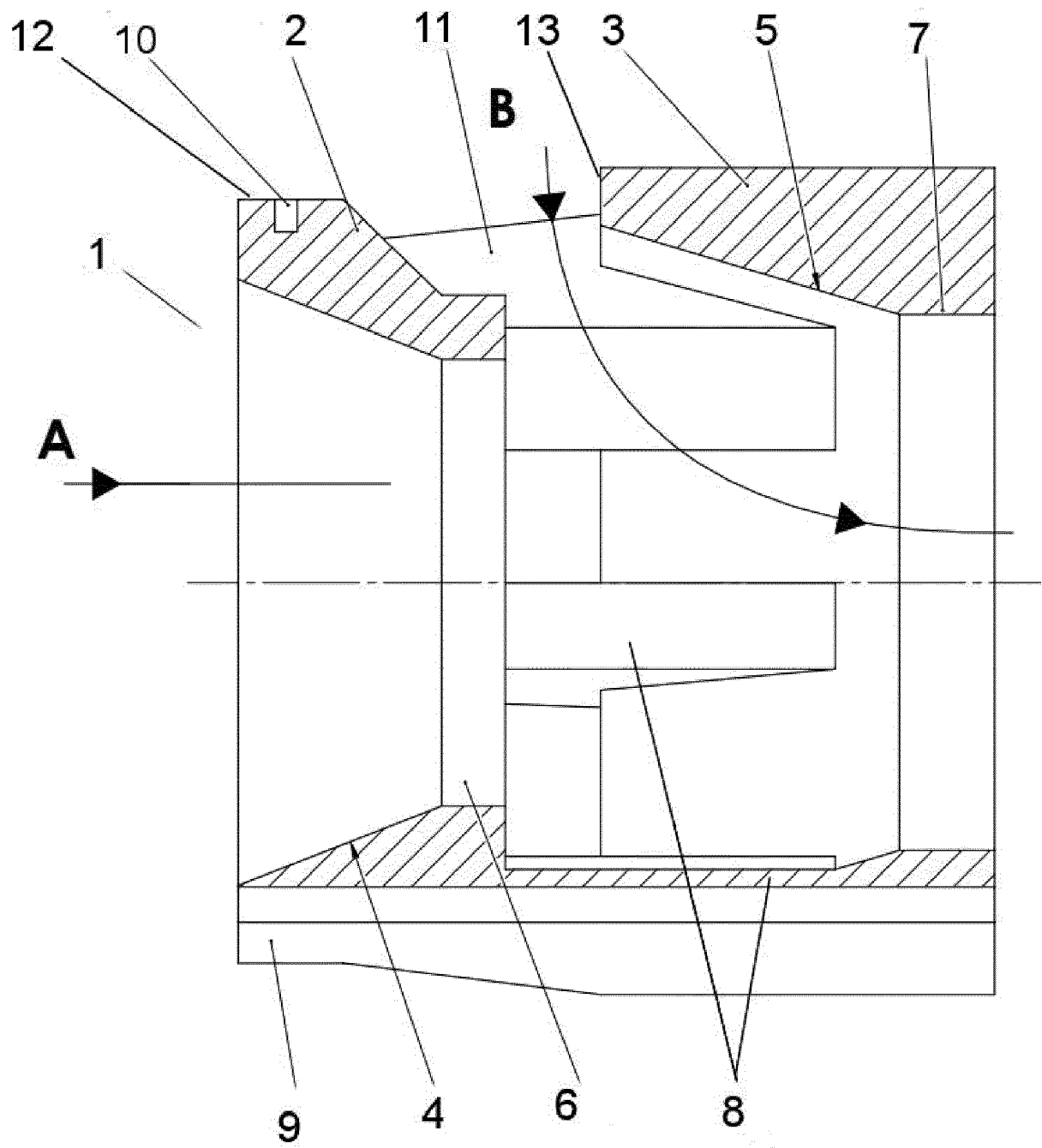


Fig. 2

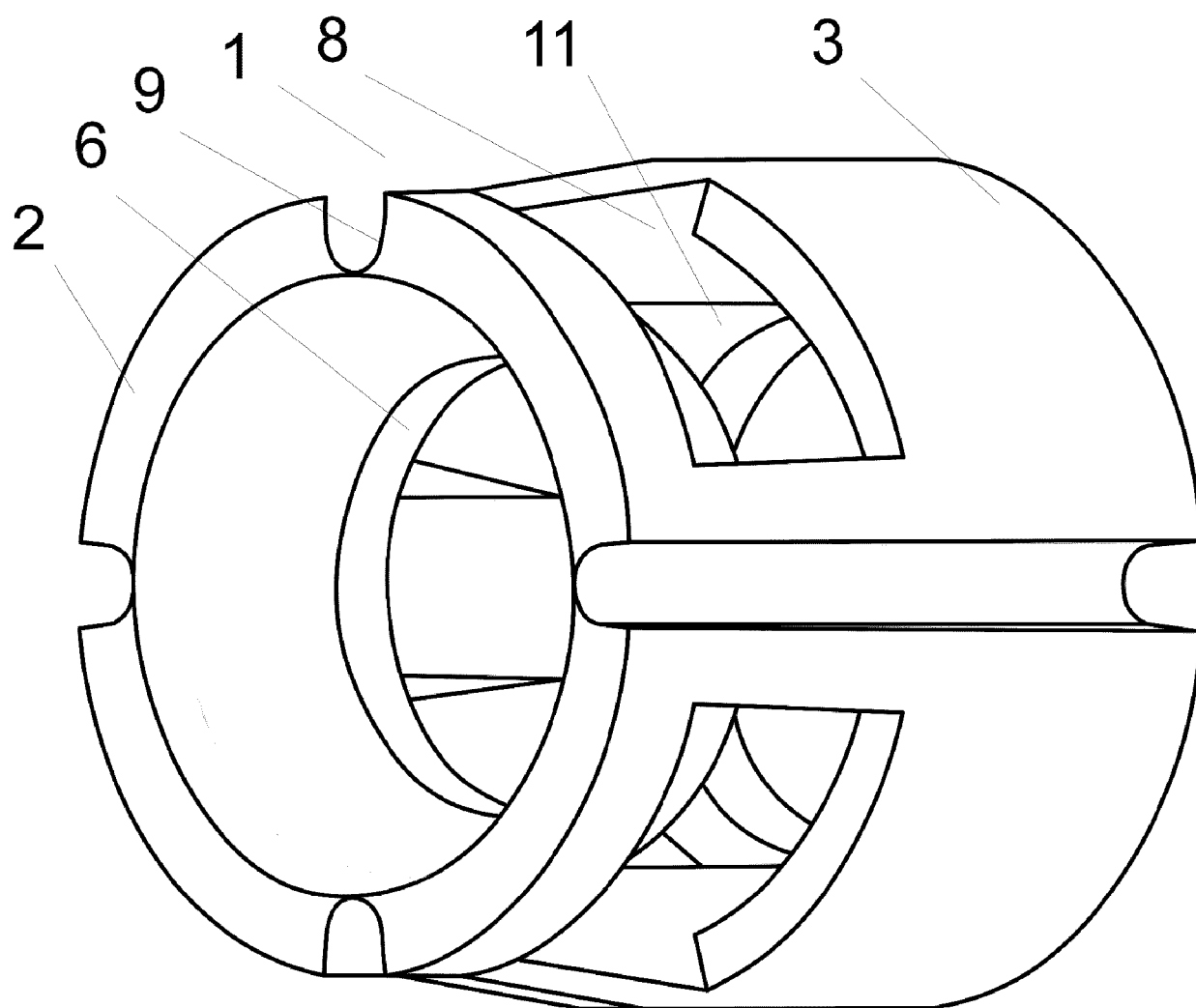


Fig. 3

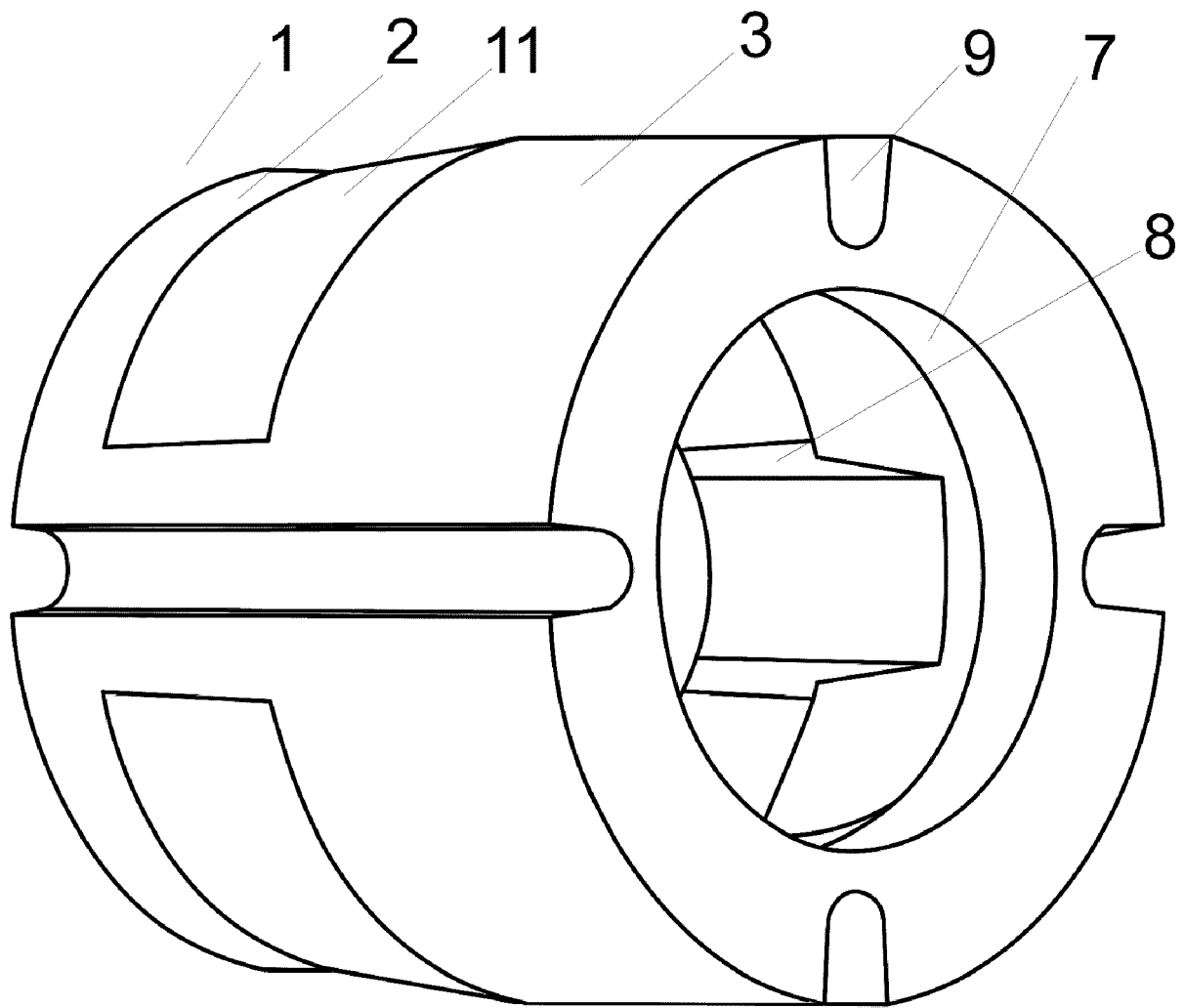


Fig. 4

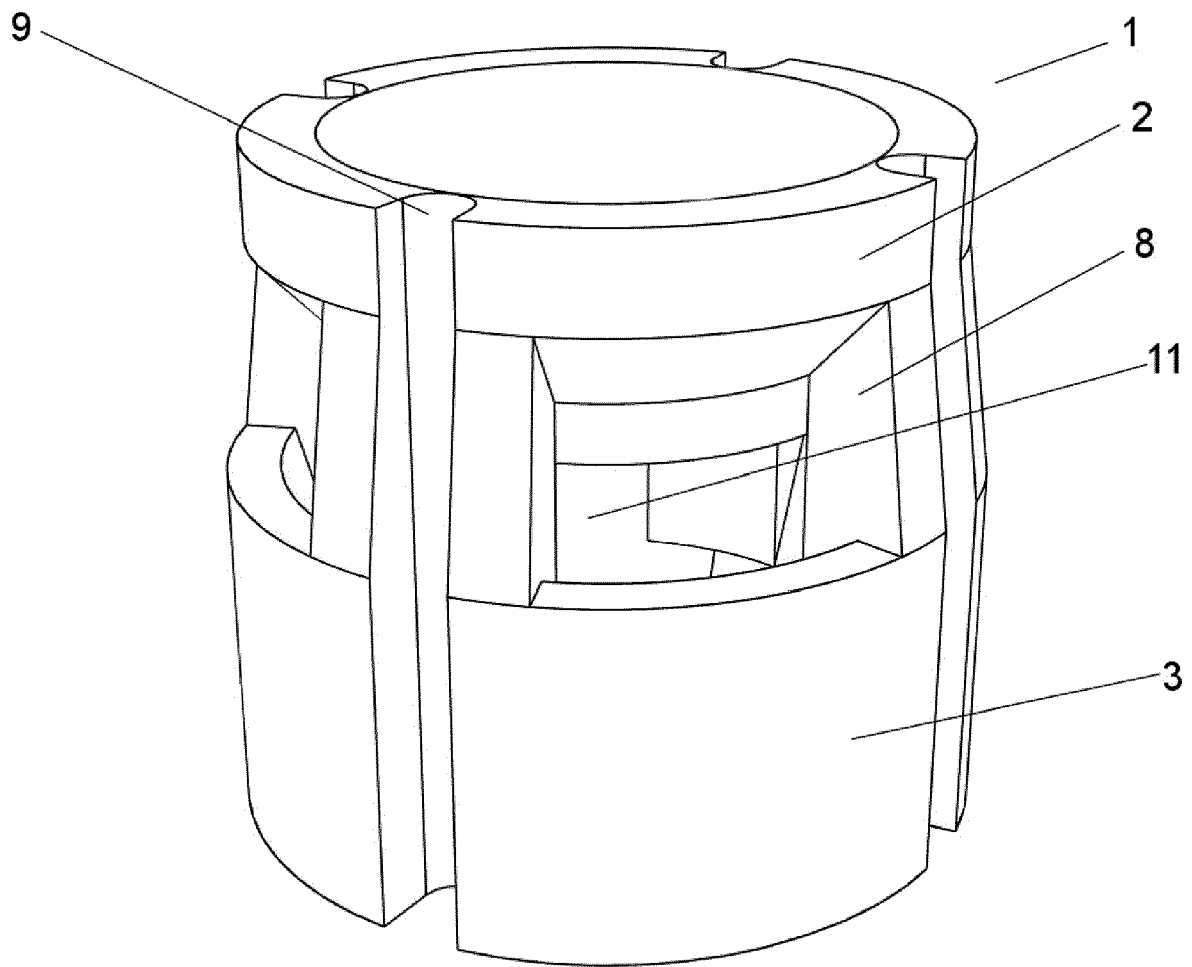


Fig. 5



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Application Number

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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 May 2022	Examiner Vogl, Paul
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