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TRANSLATION

A CENTRIFUGAL ATOMIZER FOR LIQUID AND COLLOID SOLID FUELS

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UNEDITED ROUGH DRAFT TRANSLATION

A CENTRIFUGAL ATOMIZER FOR LIQUID AND COLLOID SOLID FUELS

By: Gerhard Gütter (East Germany)

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A CENTRIFUGAL ATOMIZER FOR LIQUID AND COLLOID SOLID FUELS

Gerhard Gütter (East Germany)

The familiar centrifugal atomizers for liquid and colloid solid fuels burned in the combustion chambers of gas turbines, have a cone-shaped atomizer body which rotates in a fixed case. However, such atomizers are not sufficiently efficient.

This disadvantage is eliminated in the proposed atomizer, by virtue of the fact that the body of the atomizer is made in the form of a cup wheel on a circular projection from the drive shaft. This body has, on the fuel-intake side, an annular cavity for receiving and accelerating the fuel; on the side of the combustion chamber it has a cavity with a dual cone whose generatrices diverge toward the combustion chamber. Both cavities are separated by a wall with inclined apertures whose axes diverge toward the combustion chamber. The fixed case of the atomizer can be fitted with channels to feed the annular cavity of the body, tangent to and inclined toward the atomizer axis.

The atomizer is shown in the accompanying sketch.

The centrifugal atomizer for liquid and colloid solid fuels

consists of fixed case 1 and body 2 which rotates inside the case; this body has the shape of a cup wheel and is placed on annular projection 3 of drive shaft 4.

Fuel flows through channels 5 of case 1 toward the tangential channels 6, from which it emerges in the direction of rotation of body 2 with a certain acceleration in annular cavity 7 of the body. Here the fuel is distributed in a circular layer; after passing through aperture 8 in wall 9, the fuel forms a thin film on the conical surface 10 of cavity 11. This film gradually thins out toward combustion chamber 12 such that on conical surface 13 of cavity 11 the film is extremely thin, so that it can be easily removed from edge 14. Hot air enters inner cavity 15 of body 16; part of this air passes through aperture 17 into cavity 11 and, flowing along annular gap 18, partially evaporates and partially atomizes the fuel which is in the form of a thin film on conical surface 13.

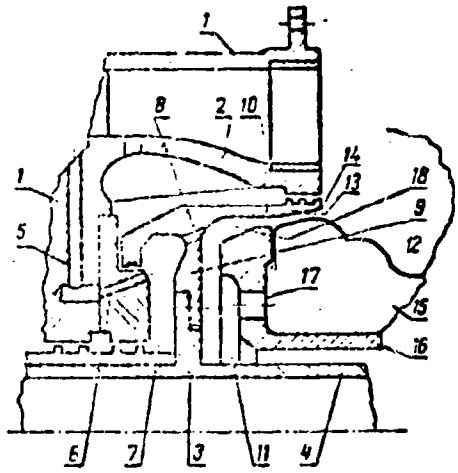
The described atomizer makes it possible to improve fuel-combustion conditions, to obtain uniform temperature distribution throughout the combustion chamber and lower the thermal stress in it, increase the efficiency of gas turbines, simplify their design and manufacture, and also economize on refractory steel and other expensive materials.

Object of the Invention

This centrifugal atomizer for liquid and colloid solid fuels burned in the combustion chambers of gas turbines consists of a cone-shaped atomizer body which rotates in a fixed case. It has the following special feature: the body is made in the form of a cup wheel on a circular projection from the drive shaft. On the fuel-intake side it has an annular cavity to receive and accelerate the fuel; on

the combustion-chamber side it has a cavity with a double cone whose generatrices diverge toward the combustion chamber; both cavities are separated by a wall and intercommunicate through inclined apertures whose axes diverge toward the combustion chamber.

A variant of this in one in which the case has fuel-feed channels inclined toward and tangent to the axis; these feed fuel to the annular cavity of the atomizer body.



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