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THE CREATION OF A NEW MODEL OF A GAS-TURBINE ELECTRIC POWER-GENERATING DEVICE

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Abstract – A hypothesis on the possibility of creating an electric power gas turbine device running on fuel gas is proposed, and the results of preliminary research experiments are given to evaluate the validity of this hypothesis. The assessment criteria for mixing fuel gas and air and the quality of combustion have been identified. In particular, it has been found that the burning of fuel gas with a blue flame in a combustion chamber of a particular, proposed design, is an indication that the content of the fuel gas mixture is optimal, the mixing process is perfect, and the exhaust gas is completely expelled from the combustion chamber. It has also been revealed that the criteria for quantitative assessment of the quality of the fuel gas combustion process is the force of the exhaust gas blown out of the combustion chamber acting on the blade of the gas turbine. It is shown that the optimal content of the propane-air mixture at atmospheric pressure is 92 % air + 8 % propane, and the force of the exhaust gas flow acting on the air turbine blade was 5 dekanewtons. The calculation shows that the action of total force of two chambers on the gas turbine blade can overcome the reaction force of the generator armature with a capacity of at least 1000 W. As it is seen from the given approximate simple calculations, a large amount of electricity can be generated by the proposed gas turbine devices if they are equipped with an electric generator of appropriate capacity and the appropriate number of combustion chambers. To determine the parameters of the proposed design of the combustion chamber of the gas turbine device, such as diameter, height, and volume, materials are provided based on the experiment, and an image is obtained that establishes a relationship between the force of the combustion chamber acting on the gas turbine blade and the mentioned parameters.

Keywords – *Electric generator; combustion chamber; gas-turbine unit; gaseous fuel; heat-and-power; heat energy*

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