Creating an Environmentally Friendly Propane-Powered Gas Turbine Device

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A hypothesis is proposed on the possibility of creating a gas turbine electric power-generating device working on fuel gas and propane, and the results of preliminary research experiments are given to evaluate the validity of this hypothesis.

A simple design of the combustion chamber of a gas-turbine device was created, for which the optimal content of the mixture of propane and air was experimentally selected.

The proposed gas-turbine device will be particularly interesting for the state and private energy companies to provide electricity to remote settlements inaccessible to electrical networks, tourist sites, and ships during their stay in the ports.

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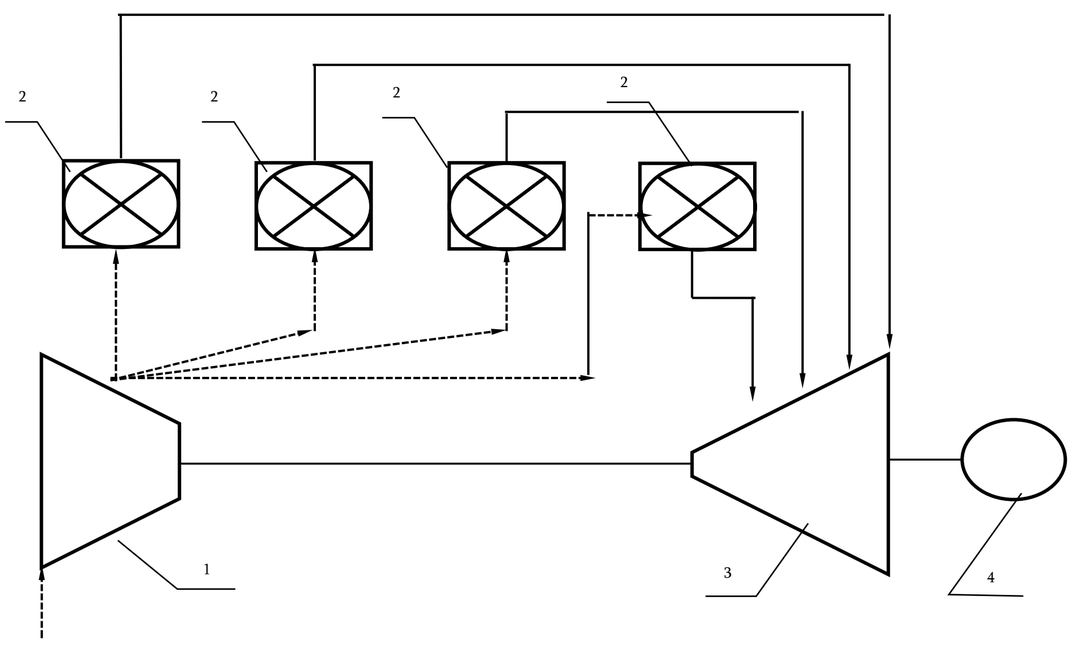
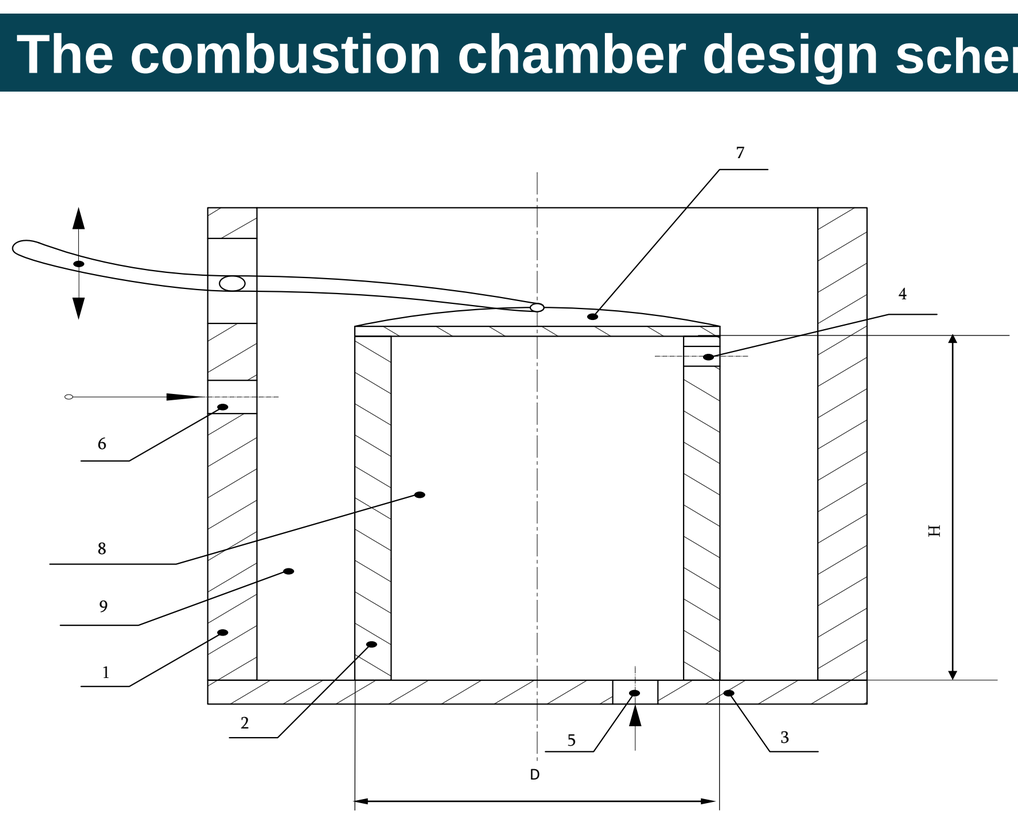
A Scheme of the Proposed Natural Gas-Powered Gas Turbine Device



The combustion chamber design scheme



The Conditions of the Experiment and the Results Obtained

Test number	Air%+Propane%	The temperature of a gaseous fuel mixture, ^{0}C	The color of the flame of a gaseous fuel mixture	The force of combustion flow acting on the blade, dkN	Note
1	100 % propane	-	-	-	Did not catch fire
2	100 % propane	-	Yellow	-	Burns in the combustion chamber for a long time
3	98 %+2 %	-	Blue	≈2	It ignited instantly, the flue gas flow was completely discharged from the chamber
4	95 %+5 %	-	Blue	≈5	It ignited instantly, the flue gas flow was completely discharged from the chamber
5	92 %+8 %	-	Blue	≈7	It ignited instantly, the flue gas flow was completely discharged from the chamber
6	85 %+15 %	-	Yellow, blue around	≈3	The flue gas remained partially in the chamber
7	80 %+20 %	-	Yellow	≈2	The mixture was burned for a long time in the combustion chamber
8	90 %+10 %	50^{0}C	Blue	≈10	The mixture burns instantly, the chamber becomes empty
9	85 %+15 %	50^{0}C	Blue	≈10	The mixture burns instantly, the chamber becomes empty
10	80 %+20 %	50^{0}C	Yellow	≈3	The mixture was burned for a long time in the combustion chamber

Schematic diagram of a possible arrangement of combustion chambers