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# **Results of Researches of TSU heat Generator And Substantiation of the Direction of Further Scientific Research Works**

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**ABSTRACT:** The article presents the results of work on the development, manufacture and testing of a TSU heat generator, as well as the rationale for further research.

**KEY WORDS:** Heat generator, combustion chamber, drying agent, heating, power, heat exchanger, burner.

## **I. RELATED WORK**

“Paxtasanoat ilmiy markazi” JSC previously conducted a study of the design and technological work of the ZDWG-60 heat generator of the Chinese company Lebed [1]. Advantages in the design and automation of the operation of the heat generator was the basis for the beginning of research work on the creation of a modern heat generator replacing the heat generators TZh-1.5 that are still crawling at the gineries (its further modernization was called IICH-1.9).

## **II. INTRODUCTION**

TZh-1,5 (IICH-1,9) heat generators are used to supply 2SB-10 drum dryers with a drying agent in the drying workshops of raw cotton. These heat generators are designed for use in natural gas and liquid fuel, the working chamber has a cylindrical shape with heat-resistant fireclay bricks, assembled using a special mixture consisting of a combustion chamber and a combustion completion chamber.

## **III. ANALYSIS OF THE CURRENT STATE OF THE PROBLEM**

The requirement to supply fuel to the combustion chamber tangentially (at a special angle) with the help of injectors and the requirements for the aerodynamic regime are among the factors complicating the technological process of IICH-1.9 heat generators. It is also known that heat-resistant chamotte bricks inside the chambers wear out over time, their breakage, splitting and fire occur as a result of the heated pieces of brick being sent to the dryer drum. Since the fuel in the combustion chamber of the heat generator is not completely combusted, the condition for the presence of the combustion completion chamber complicates the design of the heat generator.

Based on the foregoing, simplifying the design of the heat generator, improving its process by overcoming its shortcomings is one of the urgent issues.

## **IV. RESULTS AND DISCUSSION**

To solve these issues, it was planned to use the achievements of foreign science and the advantages of modern effective technological equipment and the technological process when developing a new heat generator.

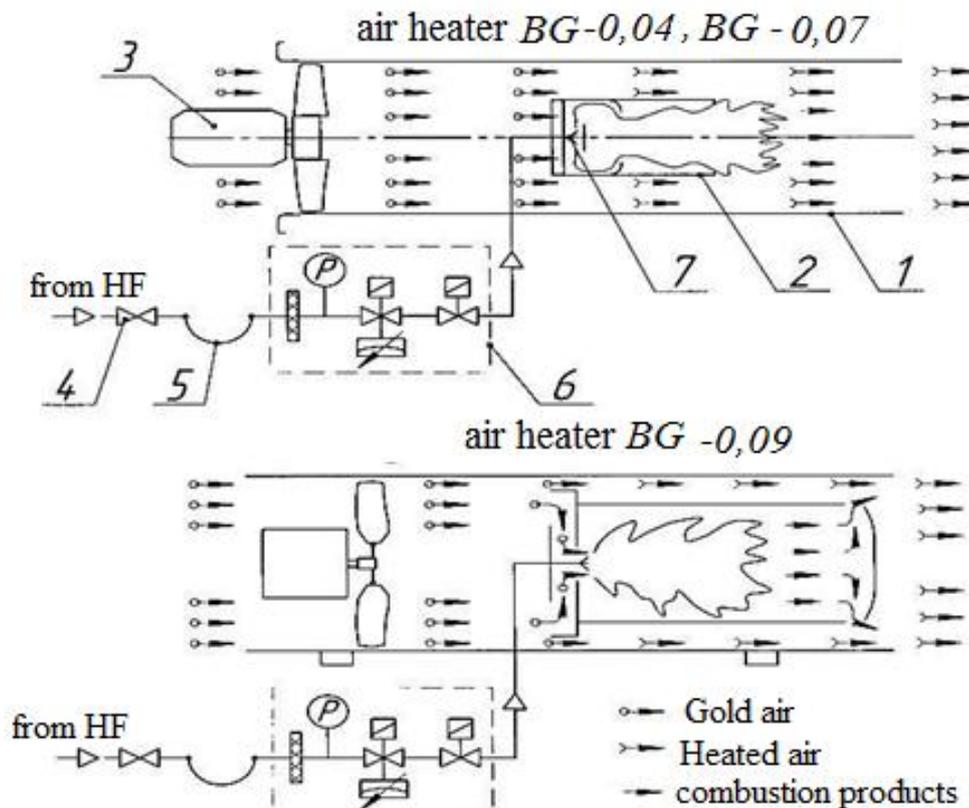
In the course of work, advanced technological processes for the preparation of a drying agent were studied.

Of the considered modern heat generators, the most acceptable include the air heating heat generator from the EURONORD HE series, which are manufactured in Russia in cooperation with a German developer and have the ability to work with a duct system. Thermal power of air heaters from 50 kW to 600 kW. This equipment can operate on different types of fuel: gas, diesel, waste oil, fuel oil, etc. It remains only to pick up the burner. The advantages of

these air heaters include: high efficiency, the use of high-quality materials, the wall thickness of the combustion chamber 3.5 mm, the automation system in the kit, ease of maintenance. Air is supplied by the fan through the air intake grill to the heat exchanger and, when heated, is discharged into the room through the blinds located in the upper part of the heat generator [2].

Gas air heaters VG-0,04; VG-0,07; VG-0,09 with a capacity of 40, 70 and 90 kW, respectively, operate on natural gas and are designed for air heating and ventilation of poultry, livestock farms, greenhouses and other structures that require maintaining a given temperature regime and its automatic provision.

Air heaters are direct heating devices, exhaust gases remain in the room. Due to the complete combustion of the fuel and the corresponding supply and exhaust ventilation, the content of carbon dioxide and combustion products in the air of the heated room is negligible and meets the requirements of sanitary and hygienic services. Air heaters are regulated according to the thermostat principle and equipped with modern safety automatics. If for some reason the device does not turn on or the flame goes out, the gas supply will immediately stop. Thus, leakage of unburned gas is completely eliminated. However, these air heaters have a low power, they cannot be used when drying raw cotton or other crops.



1-body, 2-combustion chamber, 3-fan, 4-manual valve, 5-way flexible connection, 6-gas unit (includes a filter, gas pressure sensor, pressure regulator and 2 solenoid valves), 7-burner.

Fig. 1. The technological scheme of air heaters type VG.

When developing the design of the developed heat generator, the technological scheme (Fig. 1) of the VG type air heater was used [3].

As a result of the research work, a heat generator of TGU was developed. It was equipped with an automatic burner BGN 60LX, developed by the Chinese company BAITE (Fig. 2).



**Fig. 2. General view of the developed and manufactured heat generator TGU**

The heat generator was installed in the drying line for the raw cotton of the Baghdad cotton gin instead of the IICH-1.9 heat generator. According to the test results, the developed heat generator saved natural gas consumption of 30-40% compared to the existing IICH-1.9 [4].

During research with the TGU heat generator, uneven heating of the air passing through the heat exchanger was observed, since the combustion products have a certain flow rate through the combustion chamber, therefore, in the initial part of the heat exchanger, the temperature of heating of the wall of the combustion chamber is lower than near the reflector, which is the main disadvantage of the technological process that took place in combustion chamber of the TGU heat generator.

The solution to the above problem was chosen as the direction of further research work, which is carried out in Paxtasanoat ilmiv markazi JSC.

## V. CONCLUSION

1. Existing heat generators IICH-1.9 has several drawbacks and a complex design.
2. Based on the study of modern technology for the preparation of the drying agent and the designs of heat generators, the TGU heat generator was developed, manufactured and investigated.
3. Based on the research results of the TGU heat generator, its shortcomings and the technological process are determined, its solution is found and selected as the direction for further research work.

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