СЕКЦІЯ 4. ІННОВАЦІЇ ПІДПРИЄМСТВ ГОТЕЛЬНО–РЕСТОРАННОЇ ІНДУСТРІЇ

WAYS OF TECHNICAL SUPPORT OF DECARBONIZATION

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The transition to renewable fuels such as straw, husks, briquettes, pellets only mathematically maintains a zero balance of CO_2 emissions. In fact, emissions from the combustion of these "clean" species are much higher than from the combustion of natural gas. To remove pollutants from flue gases, filters of various types are most often used [1,2,3]. Each of them has certain advantages and disadvantages.

We have obtained a patent for a condensing boiler for combustion of husks [4], which allows due to condensation of water vapor and the passage of flue gases through the overflow grate with a constant water level to remove from flue gases CO_2 ash and other harmful impurities and increase efficiency of boiler.

The boiler contains a heat-insulated tank, hot water storage tank, combustion device, overflow grate with constant water level for condensation of water vapor, purification and utilization of flue gases, sprinklers, circulating pump, flue gas outlet pipe with gas-reflecting cone, water.

The boiler works this way. When turned on, the husk enters the combustion device, where air is supplied and the combustion of the husk begins with the conversion of chemical energy of combustion into thermal energy, which is transmitted to the coolant and then to consumers. The condensate is heated by utilizing part of the thermal energy of the flue gases. Flue gases, which are formed during the combustion of the husk and contain a significant amount of harmful CO_2 emissions into the atmosphere, are fed for cleaning under the overflow grate. They pass through holes in the lattice and, bubbling through a layer of water, are cleaned by the deposition of solid particles on the surface of gas bubbles. The sprinkler constantly sprays water from the top of the settling tank, using a sprinkler pump, over the overflow grate, forming a layer of water, turning water droplets and condensing water vapor formed during fuel combustion, thus utilizing part of the thermal energy of flue gases and condensation of water vapor. Sludge accumulates in the lower part of the storage tank, which periodically drains through the sludge drain fitting.

Our developments are also effective in decarbonization of emissions: cascade heating device [5] and multi-pipe heating device [6].

The use of a cascade heating device of the proposed design, due to the installation of a heat pump installation on a direct pipeline of hot water supply for heating, which thermally insulates simplifies the design and reduces energy losses, because the boiler is slightly heated, ie the temperature difference between the water and the environment is much smaller than in the prototype, and carbon dioxide emissions are reduced.

Another example of the use of renewable sources for electric heating is our proposed wind power plant with cooling of photovoltaic converters [7].

The use of wind power plant with cooling of photovoltaic converters of the proposed design allows to increase the absorption coefficient of solar energy and reduce the heat load on photovoltaic converters by cooling their edges with air flow from the air inlets, which provides cooling temperature and normalization. their cooling, increases the energy potential of the air as a whole, which rotates the wind turbine, which in turn increases the efficiency of the wind turbine and the reliability of the installation as a whole. The generated electricity is used for electric heating

We have proposed an electrolytic device for producing hydrogen, containing a working chamber in which sets of anodes and cathodes, a fitting for water supply, a power supply, a fitting in the lid of the chamber for removing gaseous hydrogen. , a fitting on the side wall of the oxygen gas chamber, ferrite rings are installed outside the ends of the working chamber, through which a high-frequency electrode with grounding is passed [8].

The use of an electrolytic device for hydrogen production, due to the installation of ferrite rings outside the ends of the working chamber, through which a high-frequency electrode with grounding, simplifies the design, reduces energy consumption. The proposed utility model can be used in power plants using hydrogen**.** The proposed devices will reduce emissions of CO_2 and other harmful components that are formed during combustion in boilers.

References:

1. Special Report on Renewable Energy Sources and Climate Change Mitigation// 2012, Intergovernmental Panel on Climate Change ISBN 978-92-9169-131-9.

2. Teplotekhnika, teplopostachannya i vykorysyannya teploty/ Didur V.A., Struchaiev M.I. – Kiev.: Agrarna osvita, 2008. – 233 pp. [in Ukrainian].

3. Struchaiev, N., Postol, Y., Stopin, Y., Zhuravel, D., Hulevskyi, V/ Ways to improve the efficiency of pipelines heat insulation/ Problemele energeticii regionale/ inst power engineering acad sciences Moldova, str academiei 5, chisinau, 2028, Moldova.p.43-52. 4.

4. Struchaev, M.; Borokhov I.; Postol, Y. Pat. 131219: Kondensatsijnyj kotel dlja spaljuvannja luzgy [Condensing boiler for burning husks] 2019.

5. Struchaev, M.; Petrov V.; Postol, Y. Pat. 134287: Kaskadnyj opaljuvalnej prystrij [Cascade heating device] 2019.

6. Struchaev, M.; Samojchuk K.; Paljanychka N.; Postol, Y. Pat. 134180: Multyteplotrubnyj opaljuvalnej prystrij [Multi heat pipe heating device] 2019.

7. Struchaev, M.; Postol, Y. Pat. 129463: Vitrogelioenergetychna ustanovka z okholodgennjam photoelektrychnyh peretvorjuvachiv [Vitrogelioenergy installation with cooling of photoelectric converters] 2019.

8. Struchaev, M.; Postol, Y. Pat. 139179: Prystrij otrymannja vodnju [Hydrogen production device] 2018.