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Accumulating decentralized heating supply systems with a variable hydraulic regime
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<p>The thesis is devoted to the improvement and effective use of water accumulating decentralized heating supply systems with adjustable hydraulics regime. Part of the thesis is an analysis of existing methods of thermal heating supply with variable hydraulic regime, which suggest a storage tank as a source of thermal energy.</p> <p>The thesis establishes that the decrease in the work efficiency of accumulating heating systems is caused by a number of factors, including storage tank hydraulics, changes in expenditure of heat carrier and temperature pressure when using the storage tank as a source of thermal energy. The thesis also reveals that the use of swirling flows for the intensification of heat transfer and temperature control fluid is the most promising.</p> <p>Through theoretical investigations it was revealed that when applying the local control of the thermal capacity of the heaters with thermostats, the time of maintaining required temperature in the room when using the battery in comparison with the calculated one is reduced to 50%, due to the limited capacity of the thermostatic valves on the heating devices.</p> <p>Thesis also identifies the areas of energy-efficient use of the Ranque effect in the fire-tube low-power boilers, characterized by the fact that the energy separation of the flows allows to redistribute the heat load for heating and hot water supply, depending on required one, during the heating period, and thus increase the efficiency of heat use in the decentralized systems with variable hydraulic regime.</p> <p>It is proposed in the thesis that decentralized heat supply systems which operate in the accumulative mode, should perform the calculation taking into account the cooling of heat carrier - on average between maximum and minimum temperatures. Part of the thesis describes the design of the storage tank, in which the heat carrier is evenly distributed throughout the system. Thesis also suggests the method of engineering calculation of thermal energy f batteries for water heating systems with variable hydraulic setting, which allows to consider the reduction of the thermal capacity of the battery when operating without an external heat source.</p> <p><b>Key words:</b> vortex tube, accumulating heating, heat carrier, thermocontroller.</p>