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PROBLEMS OF CREATING MINIATURE FLAT HEAT PIPES

The thesis is devoted to the investigation of the contemporary state of miniature flat pipes, their use, characteristics, parameters and ways of their creation and modification. The goal is to highlight that designs of pipes can vary from device to device but we have to assume that cooling systems are equally important.

With the development of technology and modern high-tech devices, problems often arise to ensure their temperature conditions. To solve this problem, heat pipes of various designs have been successfully used in recent decades. These designs are constantly being improved, optimized, and new ones are being developed.

One of these designs is a flat heat pipe, which has some advantages over traditional heat pipes of circular cross-section. The main advantage is that the flat shape of the pipe body corresponds to the flat shape of most fuel elements of electronic devices that require cooling. This makes it possible to reduce to a minimum the thermal resistance between the heat release point and the heat pipe and more effectively use the internal volume of the electronic device. This is especially important when using heat pipes in mobile devices such as tablets, smartphones, and other miniature electronic products.

As a result of the literature review, it was determined that there are currently enough publications that are devoted to the topic of flat heat pipes and their use. For example, [1] and [2] used miniature flat heat pipes for cooling mobile electronic devices. They have shown their effectiveness, namely: improving the thermal characteristics of the cooling module, increasing productivity and effective thermal conductivity. At the same time, experiments described in sources [3] and [4] were carried out, in which flat heat pipes were used for cooling systems of powerful overall installations (Fig. 1).



Figure 1-Design with integrated flat heat pipe

A number of other scientists in this field are also interested in the topic that is covered in the thesis. We also deal with the hopes of the producers and the permanent quest for perfection that the consumers demonstrate. The research results indicate that the problem of creating cooling systems for miniature devices is very urgent and for its successful solution it is necessary to investigate and analyse the processes, characteristics and ways to optimize the parameters of miniature flat heat pipes.

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