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A new method and device for drilling rubber conical tubes

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Abstract

This article presents the results of research on the development of a new method for drilling rubber stoppers, which are currently used in chemical laboratories, research institutions and in laboratory courses of academic institutions.

The construction of a new drilling device has been developed, and experimental prototypes have been created. The device consists of a support base on which a stopper holder with conical holes of different diameter is mounted. The stopper holder is pressed against the support base by wing nuts to securely clamp the stopper. The device can be used for drilling stoppers of various materials with all types of drills. The device can be made using manual bench-work and carpenter tools, hand electric drill and standard hardware. The final hole in a rubber stopper has a diameter smaller than the diameter of the drill used due to the rubber elasticity. Such a difference in the diameter significantly increases time for drill selection and also increases the number of rejected pieces. Accordingly, the relationship between the drill diameter and the final hole diameter in the rubber stoppers was investigated, and the corresponding mathematical correlation was found. To ease the calculations, a computer program has been developed. An application for a utility model for a novel design of drilling device for drilling rubber stoppers was filed, and the decision for granting of patent was made.

The prototype of the developed device has been effectively used in chemical laboratories of Samara State Technical University for drilling stoppers made of different materials (rubber, PTFE, polyethylene, polypropylene) with no greasing or other special pretreatment of stoppers.

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