APPLYING SOME RULES VALID FOR AXIOMATIC DESIGN AND IDEAS DIAGRAM IN CASE OF A DEVICE FOR ABRASIVE FLAP FINISHING OF SPIRAL GROOVES

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Abstract: *In order to decrease the roughness of functional surfaces, various manufacturing methods could be used. A group of such machining methods is based on the use of abrasive particles as machining tools. If one takes into consideration the finishing of the external spiral grooves, one can find that only fewer machining methods could be applied. One of these finishing methods is based on the use of abrasive flap wheels. Because usually there are not specialized machine-tools for abrasive flap finishing, devices adaptable on universal machine tools could be necessary. An efficient design method discussed and applied in the last decades is the so-called axiomatic design. Essentially, the axiomatic design involves the use of two axioms, namely the independence axiom and the information axiom. There is a stage in applying axiomatic design when the customer needs and the functional requirements must be established. On the other hand, the so-called ideas diagram method is based essentially on finding versions for the distinct components of the system to be designed. In a subsequently stage, the combinations of these versions are analyzed, in order to detach the most convenient version of the future system. One took into consideration establishing the functional requirements and design parameters specific to the axiomatic design method by means of ideas diagram method.*

Keywords: *abrasive finishing, abrasive flap wheels, axiomatic design, ideas diagram method, lathe device.*

1. Introduction

Within mechanical equipment, there are situations when the proper functioning of the equipment needs the use of surfaces characterized by low roughness.

For example, in order to decrease the energy losses by friction, surfaces having a roughness corresponding to the parameter *Ra* equal to 0.2-0.8 μm could be preferred.

In order to obtain such low roughness surfaces, classical and nonconventional machining methods are applied. A certain group of machining methods is constituted by those based on abrasive processes.

One can notice that there are abrasive machining methods which use rigid abrasive tools and, one the other hand, abrasive machining methods involving the use of flexible tools or of free abrasive particles (these free abrasive particles are found usually in a work fluid).

There are many machining methods based on using rigid abrasive tools (like grinding, honing, superfinishing etc.). In the case of complex surfaces, the use of rigid abrasive tools could be difficult and this was the main reason of development of certain finishing methods able to use flexible abrasive tools. One of these machining methods is the finishing method with abrasive flap wheels. The method could be applied inclusively in case of necessity of finishing spiral grooves. Essentially, the abrasive flap wheels include a