

MULTIENERGETIC TECHNOLOGIES AND HYBRID VIBRATORY MACHINE TOOLS FOR FINISHING AND SCARFING PROCESSING OF BODY PARTS OF SOLIDS OF REVOLUTION

Authors: Mitsyk A.V.

Basic characteristics, essence of the development.

The essence of the development lies in creating new technologies and equipment for finishing and scarfing processing by synthesizing different types of dynamic impact on free abrasive environment and workpieces; aggregating vibration processing systems; expanding technological capabilities of vibratory processing by creating conditions of usage of the full range of granulation of free abrasive environments for finish processing of surfaces of body parts of solids of revolution; and by optimizing rational conditions of shape-generating and microcutting.

Patentable and competitive results.

1. Ukraine pat. 66646, IPC B24B 31/06. Method of Vibratory Processing of Parts / A.V. Mitsyk; Appl. 23.06.2011; Publish. 10.01.2012, Bull. № 1. Applicant and owner Volodymyr Dahl East Ukrainian National University.

2. Ukraine pat. 69420, IPC B24B 31/06. Method of Vibratory Processing of Parts / A.V. Mitsyk; Appl. 31.10.2011; Publish. 25.04.2012, Bull. № 8. Applicant and owner Volodymyr Dahl East Ukrainian National University.

3. Ukraine pat. 69421, IPC B24B 31/06. Method of Vibratory Processing of Parts / A.V. Mitsyk; Appl. 31.10.2011; Publish. 25.04.2012, Bull. № 8. Applicant and owner Volodymyr Dahl East Ukrainian National University.

4. Ukraine pat. 69757, IPC B24B 31/06. Method of Vibratory Processing of Parts / A.V. Mitsyk; Appl. 07.11.2011; Publish. 10.05.2012, Bull. № 9. Applicant and owner Volodymyr Dahl East Ukrainian National University.

5. Ukraine pat. 69967, IPC B24B 31/06. Vibratory Machine for Finishing and Scarfing Processing of Parts / A.V. Mitsyk; Appl. 18.10.2011; Publish. 25.05.2012, Bull. № 10. Applicant and owner Volodymyr Dahl East Ukrainian National University.

Comparison with world analogues.

Usage of the proposed technology and equipment provides descarfing, rounding sharp edges and vibrogrinding to reduce the surface roughness to $Ra = 0,63$ micron and vibropolishing to $Ra = 0,16$ microns on blanks of body parts of solids of rotation, and such parts as sleeves, pulleys, coils, through hole gears that can be used when installing into the working tools of vibratory machine tools. At the level of world analogues, e.g., United States Patent № 5570848, cl. B02S 17/14, Nov. 5, 1996.

Economic attractiveness of the development for market promotion, implementation, parameters, price.

Usage of the proposed technology allows removing burrs with thickness of up to 0.15 ... 0.18 mm, rounding sharp edges to the radius of 0.2 mm, grinding the surface up to $Ra = 0,63$ microns within 60 minutes, polishing the surface up to $Ra = 0,16$ micron within 20 minutes. Performance of multienergetic technologies and hybrid vibratory machine tools compared with classic models enables a 1.4 ... 1.6 growth by using additional energy impact on the abrasive environment and workpieces.

Branches, ministries, departments, enterprises and organizations where the development results are going to be implemented.

Mechanical engineering, instrument making, metal-working industries.

Development readiness level. Research and industrial prototype and engineering design.

Implementation results. Introduced into the educational process, diploma projects.