DIPLOMA THESIS EVALUATION

Student´s name and surname: Rakesh Nag

Name of the diploma thesis: Modification of the mechanical system of the needle bar

Supervisor of the thesis: Ing. Jiří Komárek, Ph.D.

1. Diploma thesis evaluation

Evaluation	excellent	excellent minus	very good	very good minus	good	failed
Meeting the goal and fulfilling task of the thesis	X					
Quality of conducted survey	X					
Methodology of solutions	X					
Expert level of the thesis		X				
Merit of the thesis and its potential applicability of results			X			
Formal and graphic level of the thesis	X					
Student´s personal approach		X				

Mark **x** in the corresponding box.
Supervisor´s final evaluation is based on his/her overall subjective evaluation.
Grading is stated literally in the article no. 5, neither by a number, nor by a letter.

2. Comments and remarks on diploma thesis:

The student has very well mastered the problem of the mechanical system of the needle bar. Based on the analysis of the existing solution, he was able to suggest several options for the needle bar modification, which could lead to a reduction in vibration and noise. It can be appreciated that in finding a solution, he tried to use the basic physical properties using the TRIZ method. He chose two unexplored variants of the modification for the research itself. He uses a wire rope isolator on the one hand and permanent magnets on the other hand to dampen the shock of the needle bar control element. To verify the correctness of the solution, he developed a mathematical model by using the Creo Mechanism program. Here I must emphasize that the student coped relatively well with the application of magnetic force, found its characteristics by simulating the magnetic field in the FEMM program. I especially appreciate his approach in trying to find a suitable pair of magnets, where he performed an extensive sensitivity analysis, the main results of which he presented in his work. The result of his work are two modification designs of the needle bar that lead to a reduction of vibrations. In addition, it will be possible to test these modifications in the future on a designed and manufactured functional model without the need for major intervention in the existing needle bars. Finally, the student also showed knowledge in the processing of drawing documentation of selected parts of the function model.

3. Questions about diploma thesis:

1) Would it be possible to improve the response of the needle bar (velocity, acceleration), for example by changing the material of the magnets or by arranging the magnets differently?
2) How did you solve the nonlinear course of stiffness of the rubber pad in the mathematical model?
3) Is it possible to use the proposed modifications in the existing sewing machine without the need for major modifications of the sewing machine?

4. Supervisor´s statement on results of the inspection carried out by the anti-plagiarism program in the STAG system:

Based on the performed inspection, no similarity was found with other documents.

5. Supervisor´s grading of the diploma thesis:

The diploma thesis meets all the requirements for awarding an academic degree. I rate it with the mark:
Excellent minus.

Date: 26. 1. 2021, in Liberec

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Supervisor´s signature