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TRIBOLOGICAL SYSTEM AND METHOD FOR EVALUATING ENERGY LOSSES IN GEARED GEARS

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Goal: The purpose of the invention is to ensure the possibility of varying the relative sliding with friction between the discs of the tribomodel designed on the basis of the analysis and reproduction of the kinematics of the gears in the transmission with real multi-pair gearing of the teeth.

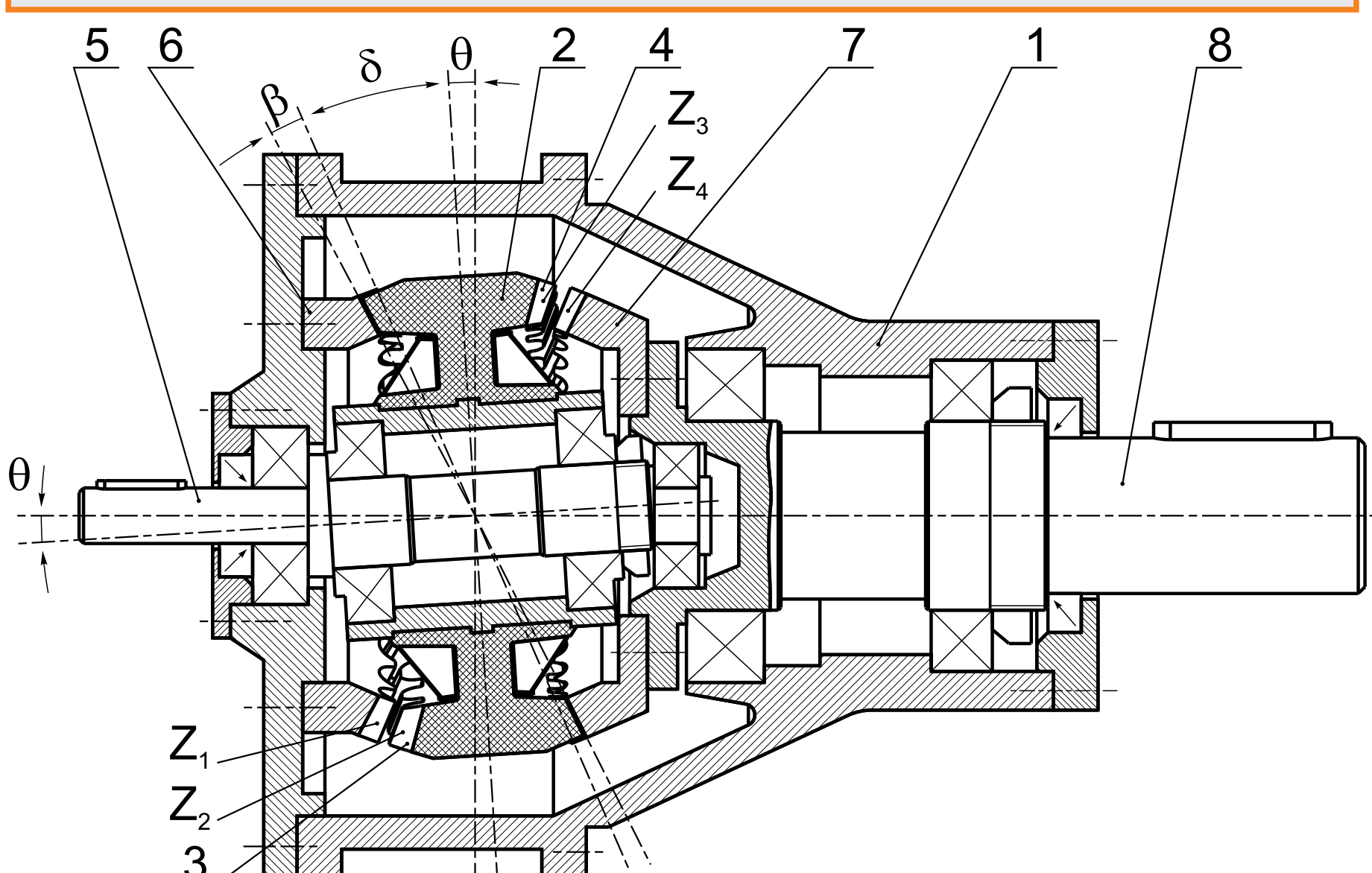
Solution: The technical result of the invention consists in ensuring the possibility of accurately reproducing the kinematics and operating conditions of the real multi-pair gear including the tribological characteristics in the contact of the teeth depending on the relative sliding speeds with friction between the mating flanks.

Advantages:

- ensuring the possibility of accurately reproducing the kinematics;
- accurately reproducing the operating conditions of the gearreal multipares;
- obtaining the tribological characteristics in the contact of the teeth depending on the relative sliding speeds with friction between the conjugate flanks.

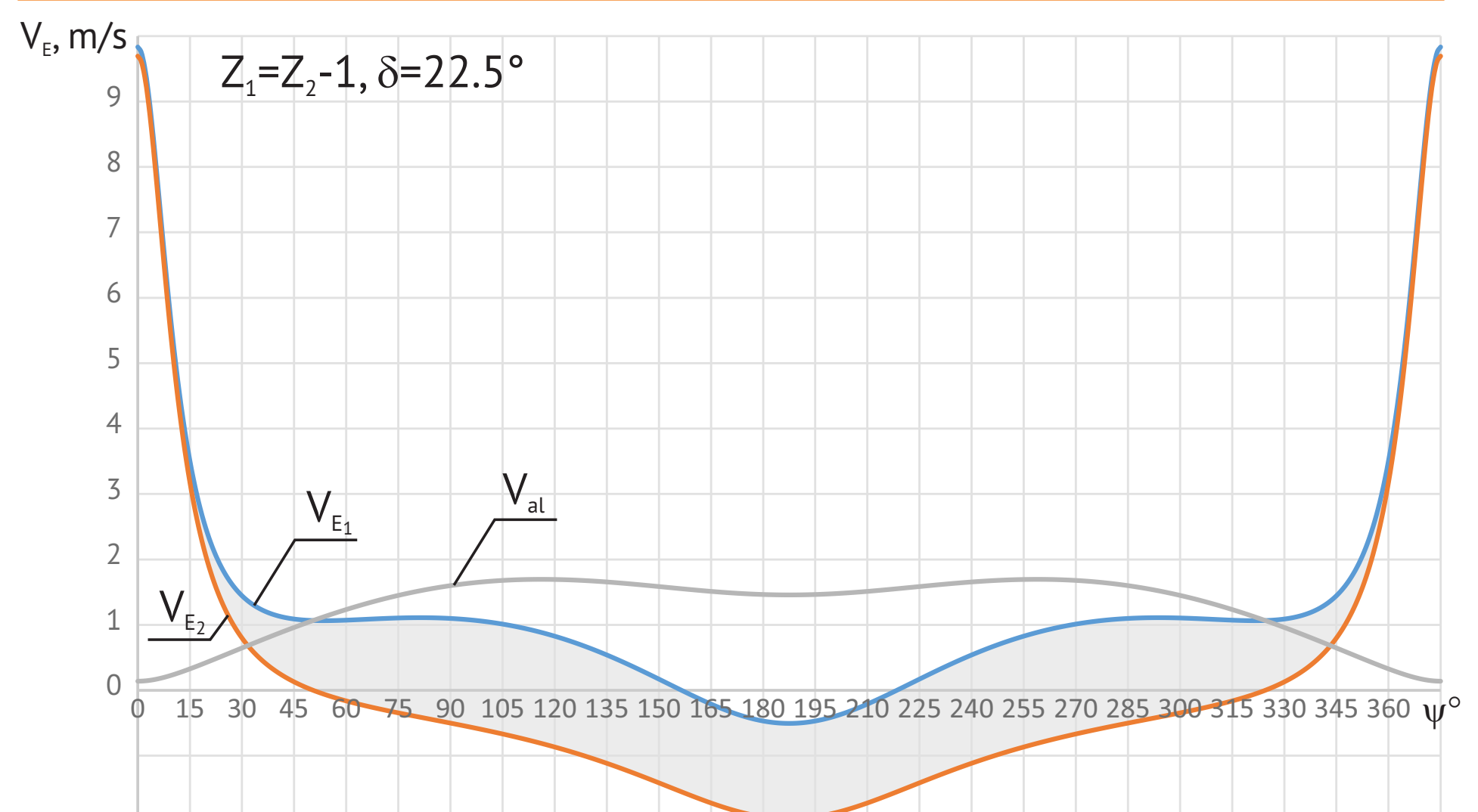
Stage: The technical project and the experimental model are elaborated.

Overview of precessional planetary transmission in axial section

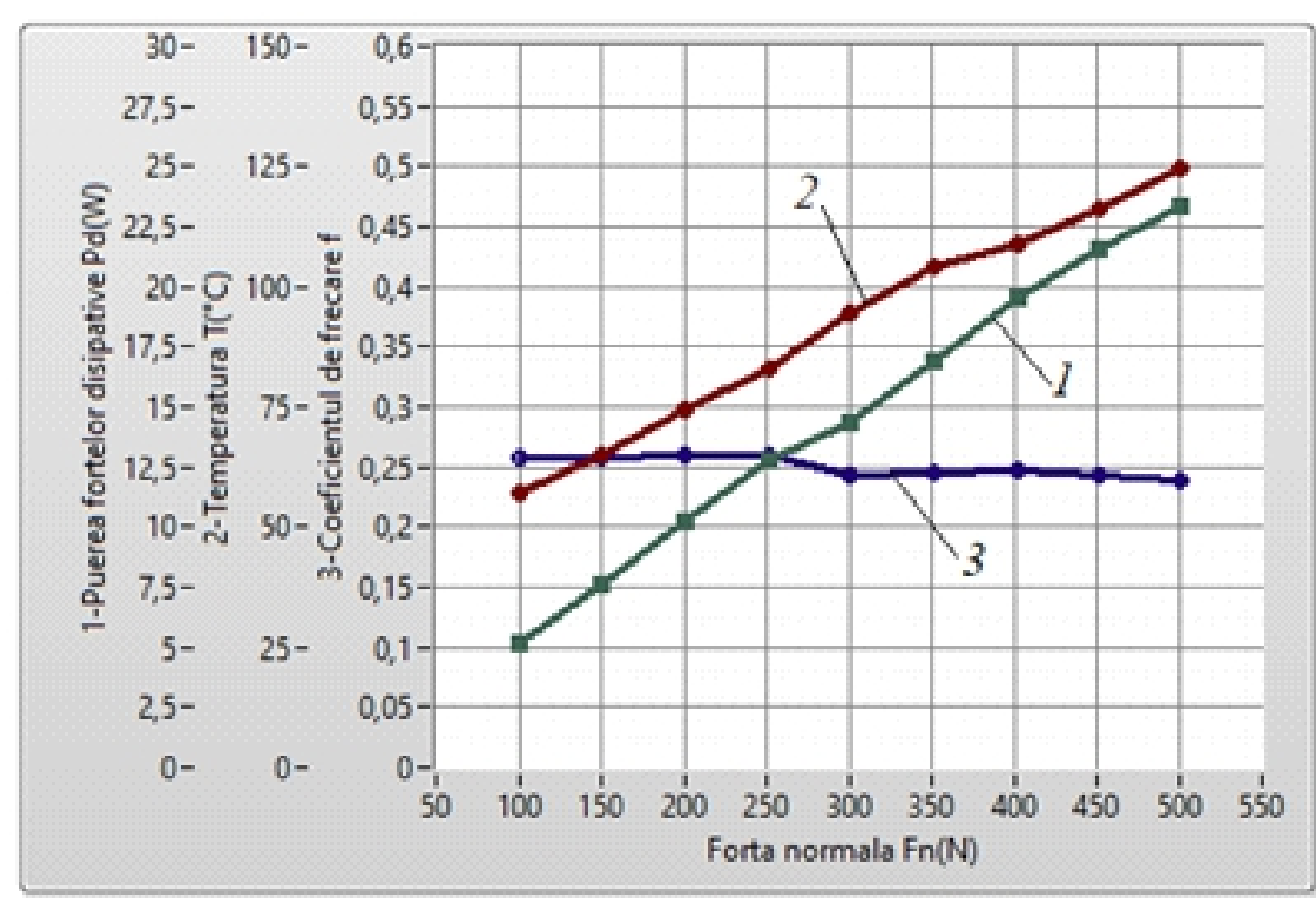


The precessional transmission contains a housing 1, in which are located a satellite wheel 2 with two bevel gear crowns 3 and 4, a crank shaft 5 and two central bevel gears, one fixed 6 rigidly connected to the housing 1 and another 7 connected to a driven shaft 8, the wheels engage in multi-pair convex-concave gearing with the teeth of the satellite wheel 2 executed with a circular arc profile of radius r , and of the gear wheels 6 and 7 with curvilinear profiles with variable curvature increasing towards their top.

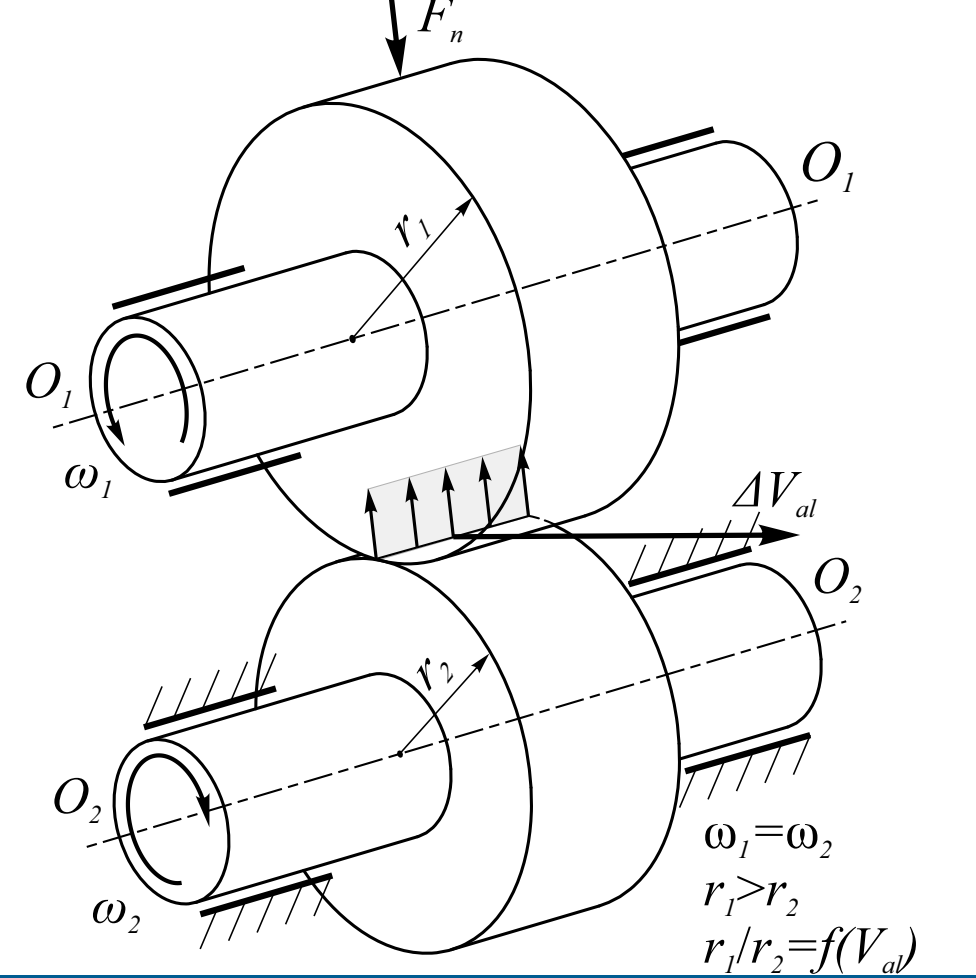
The relative sliding speed V_{sl} between the flanks of the teeth in function by the precession angle ψ for $Z_1=Z_2-1$ (the precessional gear $Z_1=24, Z_2=25, \theta=3.5^\circ, \delta=22.5^\circ, \beta=4.78^\circ, r=6.27\text{mm}, R=75\text{mm}$)



Variation of the coefficient of friction μ , temperature t , and power P of energy dissipation when loading the contact with the normal force F_n



The model of the geometric and kinematic similarity between the real gear contact, represented by two cylindrical rollers, with convex-convex relative position



Profigram of teeth simultaneously conjugated at the contact points $k_0 \dots k_i$

