

MD.8.	
Title	PRECESSIONAL GEAR TRANSMISSION
Authors	Viorel BOSTAN; Ion BOSTAN; Maxim VACULENCO; Ion BODNARIUC; Dumitru VENGHER; Radu CIOBANU; Oleg CIOBANU.
Institution	Technical University of Moldova
Patent no.	Patent SUA – US 11913523 B2, Date of Patent: Feb. 27, 2024.
Description	The invention relates to the mechanical engineering, namely to mechanical transmissions.
	The transmission comprises a body (1), a satellite wheel (2) with two bevel gear rings (3) and (4) driven by a crankshaft (5) in sphero-spatial motion around a fixed point, two central bevel wheels (6) and (7), one immobile 6 fixed in the body (1) and the other mobile (7) mounted on a driven shaft (8).
	The teeth of the gear rings (3) and (4) of the satellite wheel (2) have a circular arc flank profile, and of the central bevel wheels (6) and (7) variable curvilinear, depending on the angles and , on the number of Z teeth and the ratio of the numbers of teeth of the mating wheels in the gears (Z_1-Z_2) and (Z_3-Z_4), as well as the radius r of the circular arc of the teeth profile of the gear rings (3) and (4). The configuration of the numerical values of the said parameters determines the geometry and the kinematics of the convex-concave contact of the teeth, the degree of frontal overlap, expressed by the number of simultaneously engaged pairs of teeth and defines the pressure angle between the mating flanks. The execution of the wheels with inclined teeth provides for the increase in the total contact line and the share of pure rolling

of the teeth in gear due to their sphero-spatial interaction. The tooth gear is multipair, the teeth flanks mate in contacts with convex-concave geometry with minimal difference of curvatures and with reduced relative sliding velocity, and the active flanks interact with each other with small angles of mutual pressure.

The technical result consists in increasing the load-bearing capacity and mechanical efficiency of the precessional gear by creating the multipair and convex-concave teeth contact with the minimum difference of curvatures of the flank profiles and with reduced relative frictional sliding between the flanks of the teeth, as well as in extending the kinematic possibilities and functionalities of the transmission.

For the essential extension of the functional and kinematic possibilities, the transmission further comprises a mobile intermediate central wheel with two bevel gear rings each engaged with a gear ring of two satellite wheels, placed laterally and mounted on spherical supports symmetrical to their precession centers, being consecutively coupled to two cranks.