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PROCESSES AND DEVICES FOR ADDITIVE MANUFACTURING OF GEARWHEELS AND PRECESSIONAL GEARS

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Goal:

The invention relates to the construction of machines, in particular to additive technologies for the manufacture of gears from precessional planetary transmissions.

Solution:

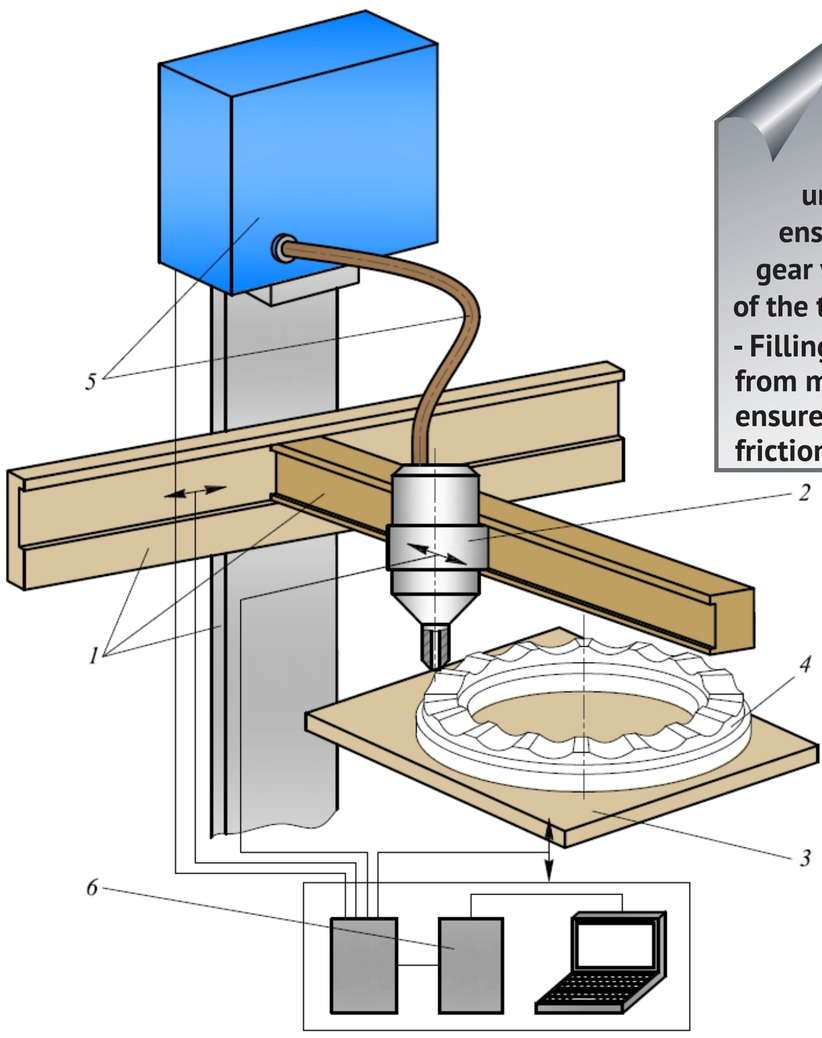
- ✓ The manufacture of teeth with the help of several heads with additive nozzles by the immediate deposition of the next layer ensures a better adhesion between layers and to the increase of the mechanical resistance of the teeth;
- ✓ The manufacture of gears from one-component metal powders with fine density of the tooth core and coarse density of the tooth surface layer with the addition of solid lubricant (graphite or MoS2) ensures increased mechanical resistance of the teeth and reduction of sliding friction power losses in the system precessional gearing.

Advantages:

Reduction of slip friction power losses in the precessional gear system;
- ✓ Increasing the mechanical and antifriction characteristics of the tooth surface material;
- ✓ Relative technological simplicity.

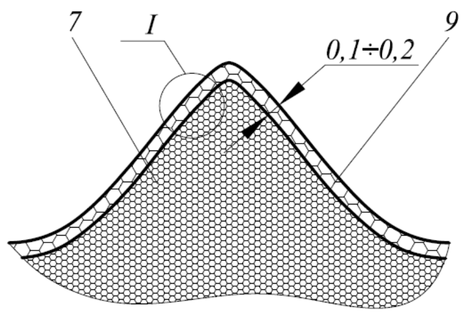
Stage: Computerized model.

3D printer overview

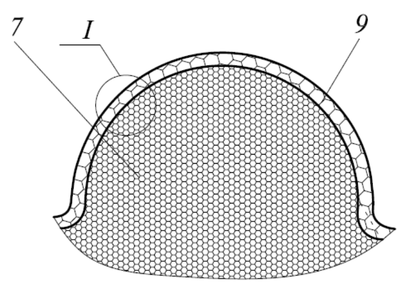


- The manufacture of teeth from fine-powder metal powders of dendrous cell units, on which a polymeric layer of diamond-type cell units with elastic structure is deposited ensures the reduction of power losses in the gear while respecting the mechanical strength of the teeth;
- Filling the pores of the surface layer of teeth from metal powders with liquid lubricant ensures the reduction of power losses at slip friction in the gear.

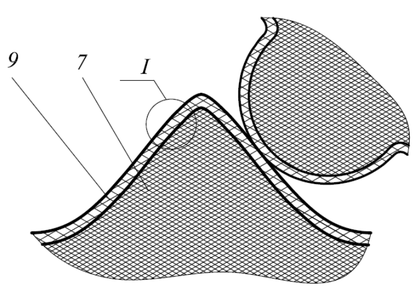
The image of the tooth with a convex-concave profile



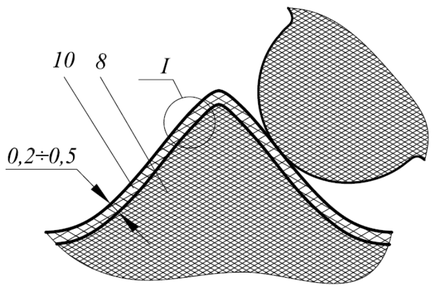
The image of the tooth with a circular profile



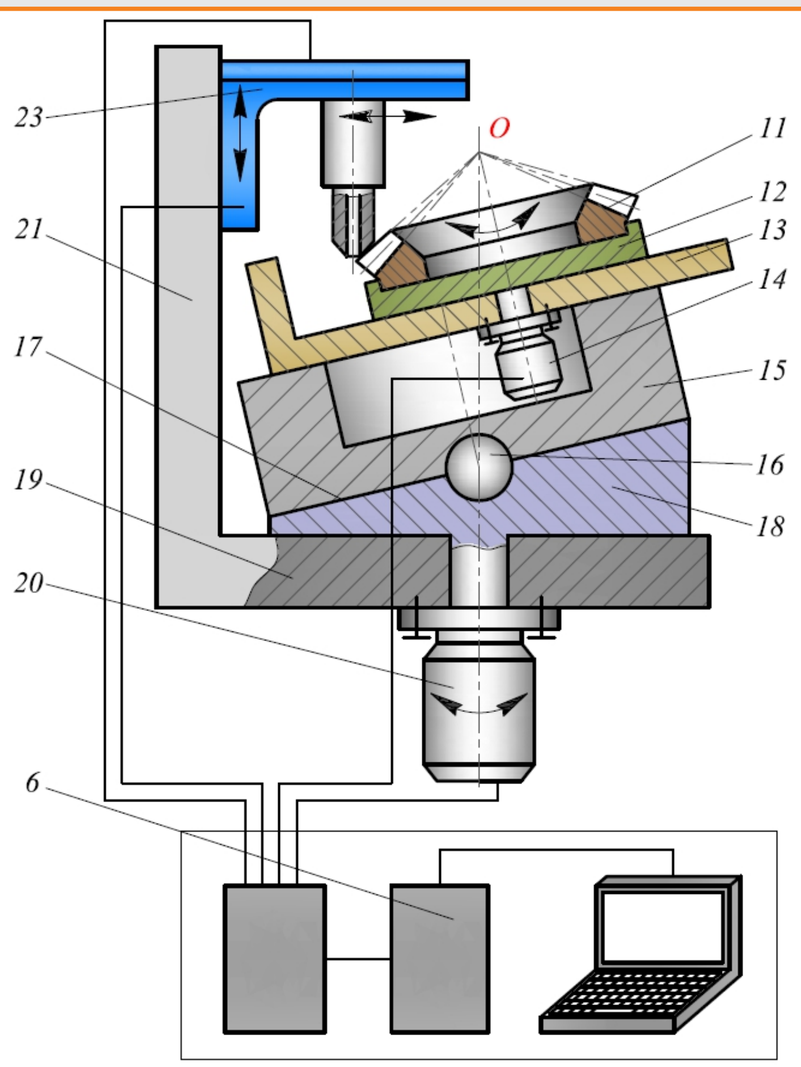
Tooth gear system (convex-concave profile) - circular tooth made of metal powders, both teeth with elastic surface layer



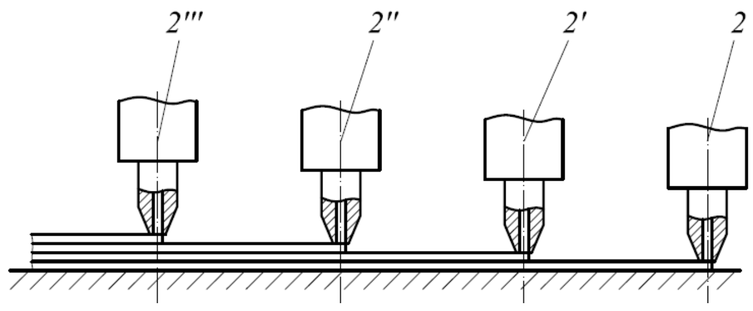
Tooth gearing system (convex-concave profile) - circular tooth made of metal powders, with elastic surface layer only on one tooth



Overview of the 3D printing device (variant II) with precessional additive head



Additive deposition scheme with several additive heads



Deposition of the surface layer of teeth with non-standard convex-concave profile already formed ensures technological simplicity and improved mechanical characteristics of the surface layer of teeth;

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