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Types of Gear Wheels, Structure, Technical Requirements for the Preparation of Ulami, Applicable Materials and Types of Raw Materials

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Abstract: *In this article, the types, structure, technical requirements for the preparation of gear wheels, used materials, types of raw materials, the technological process of manufacturing one and several flanged gear wheels in the form of a "bush" of one and two types. sequence information is provided.*

Keywords: *wheel, structure, demand, material, raw material, flange, assembly, tool, technological.*

Introduction.

The production process consists of the sum of all processes (works) performed to obtain a finished product from raw materials or semi-finished products.

The production process includes not only the main processes: the assembly of machine parts with mechanical processing, but also auxiliary processes: the transportation of parts, control, preparation of cutting tools and devices.

The technological process consists of sequentially changing the shape, dimensions and properties of the material in order to obtain a finished product from the material or raw material based on the specified technical requirements.

The main part.

Gear wheels are the most common parts of machines and mechanisms. Gear wheels serve to transmit rotational movement and torque from one shaft to another based on the specified number of transmissions. Gear wheels are widely used in speed and transmission boxes of cars, tractors, metal cutting machines, reducers, lifting and lowering devices, control devices, clock mechanisms and similar devices.

The main types and structures of gear wheels are presented. The first type of gears are cylindrical and bevel gears with and without splines. The structure of the center holes of this gear wheel is flat, key

slotted and slotted. The ratio of the length of the open central hole directed along the axis of the gear wheel to the diameter of the gear is $l/d > 1$, i.e. in the form of a "bushing" [1,2,3,4,5,6].

The second type is gears with a multi-flange flat key slot and a splined central hole.

The third type is single-flange flat, with key slotted center hole and $l/d < 1$ yaoni "Disc" type gears.

A fourth type is cylindrical, bevel, worm gears or "flanges" that are machined and assembled with a ball.

The fifth type is cylindrical and bevel gears with a tail part (in the form of a toothed shaft).

Each of the considered types of gears has its own typical technological processes and there are grinding surfaces for each [1,7,8,9,10,11,12].

The material for gear wheels is selected depending on the amount of torque and rotation speed. Wheels operating under low forces and at low speeds are made of construction steels 30, 35 or 45, not made of plastic, gray or hammered cast iron. The wheels of gear couplings working under the influence of large forces and at high speeds are made of heat-treated steel 45 or alloyed steels 40X, 12XN3A, 18X, etc.

The type of raw materials and methods of preparation of gear wheels depend on the type of their materials and the production program. Cast iron raw materials are cast iron. Gear wheels with small dimensions (up to 50 mm) are made by cutting the raw material to the required dimensions in all types of production conditions. In the conditions of granular and small series production, large-sized gear raw materials are made by free hammering on hammering machines. Raw materials for gears of medium size in small batches are prepared by stamping methods. In the conditions of mass production and mass production, raw materials are prepared in closed punches on hammering machines, presses and horizontal hammering machines, and a central hole is formed at once [1-19].

The sequence and order of performing the steps of the technological process of mechanical processing of gear wheels depends on which of the types considered above they correspond to [20-30].

The sequence of the technological process of manufacturing single- and multiple-flange gears in the form of a "bushing" of the first and second type is as follows:

- trimming of the surface surfaces and black and clean treatment of the central hole;
- black, semi-clean processing of the teeth opening surfaces and other surfaces, while filling the central hole;
- opening the tooth (initial and last cutting of the tooth, if the level of accuracy requires processing with a chisel);
- thermal processing;
- processing of a lozenge in the central hole by inserting it into the cut teeth;
- finishing processing of the teeth (in this case, the toothed gear is inserted through the central hole).

Although the sequence of mechanical processing of gear wheels in the form of "Disk" characteristic of the third type remains as mentioned above, the main technological surface is the surface of the gear wheel flange, taking into account the short length of the central hole [31-37].

Since the surface of the stepped central hole and the holes for connecting the flange with the pin serve as the assembly base in the "Flange" type gears, the sequence of processing them and similar surfaces should be as follows:

- trimming of the inner surface and treatment of all possible surfaces;

- processing of fastening holes with the central hole and the inner surface mounted on the surface;
- black and clean machining of the tooth shear flange with the gear surface mounted and the two fixing holes;
- preliminary and final cutting of teeth;
- clean cutting of the inner surface (set by teeth);
- final processing of the teeth, in this case, the gear wheel is mounted on the surface and two fixing holes;
- The process of mechanical processing of gear wheels in the form of "geared shaft" corresponds to the technology of making forks and is in the following order;
- cutting and processing the surfaces and opening the central hole;
- black and clean processing of the external rotation surfaces;
- processing of holes, slotted surfaces, key slots, grooved surfaces in gear wheels;
- open the bite;
- thermal processing;
- finishing processing of steps with high accuracy;
- treatment of tooth surfaces.

Conclusion.

In short, the processes of mechanical processing of cylindrical surfaces are carried out on lathes of the lathe group. Universal turning according to the type of production - screw cutting (grain and small series production), lathe turret and multi-tool machines (series production), semi-automatic multi-spindle lathes (multi-series and mass production), condition applies.

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