

9.8 Others

Gear cutting machine

Gear cutting machine is a kind of machine that is used to process various gears, worm wheel, rack and shaft gear in accordance with duplicating method or generating method. There are various types: gear hobbing machine, gear shaping machine, gear milling machine, gear-broach machine, gear shaving machine, gear grinding machine, gear honing machine, polishing machine and few or in- processing machine tool etc. As the rises of new types of gear, the development of gear technology, types, structures, finish machining level, automation level of gear cutting machine will also boom.

Kinematic diagram of the hobbing machine

Figure 9-11 shows various transmission routes from motor to hobbing cutter in the hobbing machine (speed transmission route, tooth dividing transmission route, feeding transmission route and differential transmission rout, etc) and their motion characteristics.

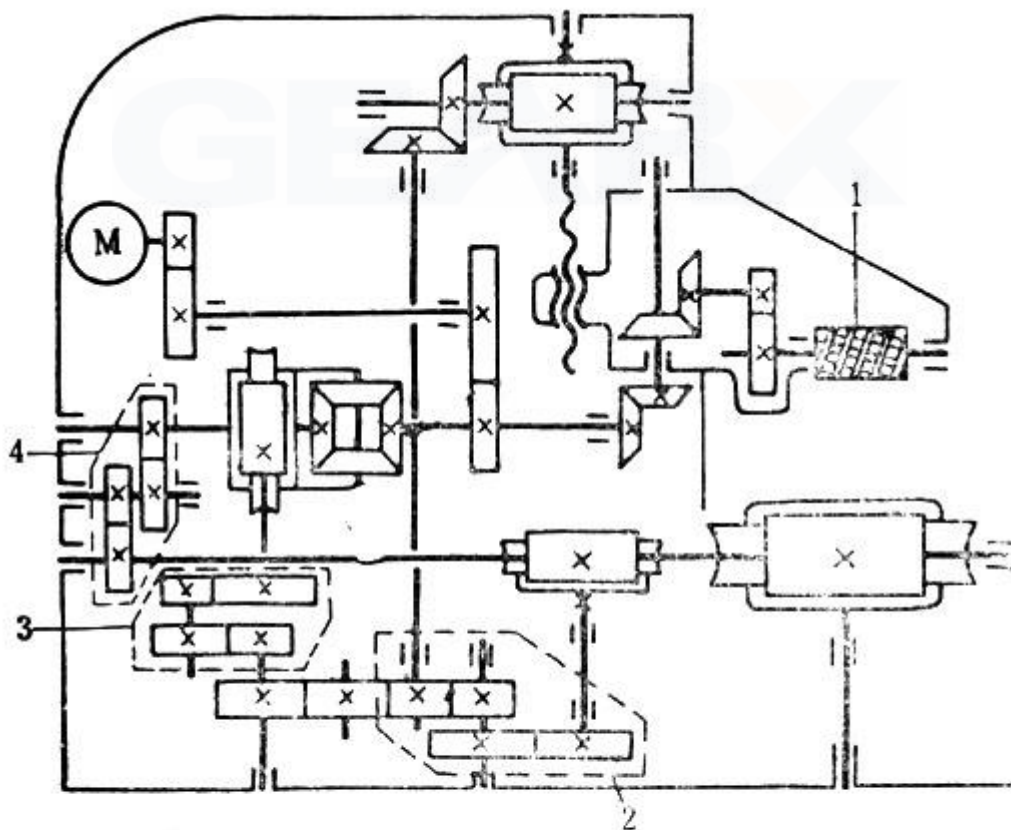


图 9-11

- 1—滚刀 2—进给挂轮架 3—差动挂轮架
4—分度挂轮架

Adjustment of gear-hobbing machine

In order to process qualified gear with given tooth number and helical angle with hobbing cutter, there will be calculation on the motion parameter and the engagement parameter, the correct installation of tool and blank, and the realization of movement, engagement and speed parameter. These are all called the adjustment of gear-hobbing machine. It can be divided into the calculation and adjustment of hobbing's setting angle; the adjustment of cutting speed; the calculation and adjustment of divided tooth gear; the adjustment of tool rest's vertical feeding and the adjustment of differential change gear.

Herring bone gear cutting machine

Herring bone gear cutting machine is applied in processing the tooth surface of herringbone gear.

It mainly takes generating method, but duplicating method is also applied when there is specific requirement on herringbone gear. The machine cuts herringbone gear at the turning point of herringbone tooth through the differential mechanism. This kind of machine performs well in the processing of herringbone gear. The processing accuracy can reach the precision of common gear hobbing machine.

Bevel gear lapping machine

It is used in machine tool of lapping bevel gear and the tooth surface of hyperboloid gear. Crowned tooth surface can be achieved by modifying the micro deformation of gear during quenching process so as to improve the contact situation of gear pair, lower noise and improve the transmission stability. Gears after lapping has improved precision and the roughness of tooth surface can be reduced to $R_a 1.6 \sim 0.80 \mu\text{m}$. Bevel gear lapping machine is one of the processing equipments in bevel gear.