

# CPC COOPERATIVE PATENT CLASSIFICATION

## B PERFORMING OPERATIONS; TRANSPORTING (NOTES omitted)

### SHAPING

## B23 MACHINE TOOLS; METAL-WORKING NOT OTHERWISE PROVIDED FOR (NOTES omitted)

## B23F MAKING GEARS OR TOOTHED RACKS (by stamping [B21D](#); by rolling [B21H](#); by forging or pressing [B21K](#); by casting [B22](#); arrangements for copying or controlling [B23Q](#); machines or devices for grinding or polishing, in general [B24B](#))

### NOTES

1. This subclass covers:
  - the use of methods or apparatus specially designed to produce accurately the shapes of gear teeth which are essential for proper intermeshing of toothed gearing elements to ensure the required relative motions;
  - the use of similar methods or apparatus in the production of other articles of toothed or like form, e.g. dog clutches, splined shafts, milling cutters.
2. This subclass does not cover the production of such other articles of toothed or like form using methods or apparatus other than those mentioned under Note (1) above.
3. In this subclass, the following terms or expressions are used with the meanings indicated:
  - "gear teeth" covers the teeth or lobes of other accurately-intermeshing members having relative movement of a similar kind, such as rotors of rotary pumps and blowers;
  - "profile" may include the outline of both faces or only one face of a tooth, or the opposing faces of adjacent teeth;
  - "straight" means that a tooth as a whole (ignoring any curvature of the tooth-face alone, e.g. crowning) is straight in the direction of its length, for example as seen in the direction of a radius of a spur wheel. It accordingly includes the teeth of helical gears and of the normal type of bevel gear;
  - "broach-milling" means milling with a rotary cutter having a number of teeth of progressively increasing depth or width.

### WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

|             |  |       |  |
|-------------|--|-------|--|
| <b>1/00</b> | <b>Making gear teeth by tools of which the profile matches the profile of the required surface (special adaptations for making curved teeth <a href="#">B23F 9/00</a>)</b>   | 5/06  | • • the tool being a grinding disc with a plane front surface  |
| 1/02        | • by grinding  | 5/065 | • • • {and the grinding disc axis varying angularly with respect to the workpiece axis}                    |
| 1/023       | • • {the tool being a grinding worm}   | 5/08  | • • the tool being a grinding disc having the same profile as the tooth or teeth of a rack                 |
| 1/026       | • • {with plural tools}  | 5/085 | • • • {and the grinding disc axis varying angularly with respect to the workpiece axis}                    |
| 1/04        | • by planing or slotting   | 5/10  | • • the tool being a grinding disc having the same profile as the tooth or teeth of a crown or bevel wheel |
| 1/06        | • by milling   | 5/12  | • by planing or slotting   |
| 1/065       | • • {with plural tools}  | 5/125 | • • {with two single-tooth tools mounted on reciprocating slides}  |
| 1/08        | • by broaching; by broach-milling  | 5/14  | • • the tool having the same profile as a tooth or teeth of a rack   |
| 1/083       | • • {by broach-milling}  | 5/16  | • • the tool having a shape similar to that of a spur wheel or part thereof                                |
| 1/086       | • • {Pot broaching}  | 5/163 | • • • {the tool and workpiece being in crossed axis arrangement, e.g. skiving, i.e. "Waelzschaelen"}       |
| <b>3/00</b> | <b>Making gear teeth involving copying operations controlled by templates having a profile which matches that of the required tooth face or part thereof or a copy thereof to a different scale (copying systems or devices per se <a href="#">B23Q 35/00</a>)</b> | 5/166 | • • • {with plural tools}  |
| <b>5/00</b> | <b>Making straight gear teeth involving moving a tool relatively to a workpiece with a rolling-off or an enveloping motion with respect to the gear teeth to be made</b>   | 5/18  | • • the tool having the same profile as a tooth of a crown wheel   |
| 5/02        | • by grinding  | 5/20  | • by milling   |
| 5/04        | • • the tool being a grinding worm   |       |  |

|              |   |              |  |
|--------------|---|--------------|--|
| 5/202        | . . {the tool having a shape similar to that of a gear or part thereof, with cutting edges situated on the tooth contour lines (tools therefor <a href="#">B23F 21/122</a> )} | <b>17/00</b> | <b>Special methods or machines for making gear teeth, not covered by the preceding groups</b>                                    |
| 5/205        | . . {with plural tools}   | 17/001       | . {for making gear pairs}  |
| 5/207        | . . . {the tools being interlocked}   | 17/003       | . {for dry cutting}  |
| 5/22         | . . the tool being a hob for making spur gears  | 17/005       | . {for machining tooth fillet or tooth root}   |
| 5/24         | . . the tool being a hob for making bevel gears   | 17/006       | . {using different machines or machining operations}   |
| 5/26         | . . the tool having the same profile as a tooth or teeth of a rack, for making spur gears   | 17/008       | . . {Features relating to transfer of work gears between different work stations}  |
| 5/27         | . . the tool having the same profile as a tooth or teeth of a crown or bevel wheel  | <b>19/00</b> | <b>Finishing gear teeth by other tools than those used for manufacturing gear teeth</b>  |
| 5/28         | . by broaching; by broach-milling   | 19/002       | . {Modifying the theoretical tooth flank form, e.g. crowning ( <a href="#">B23F 19/10</a> takes precedence)}                     |
| 5/285        | . . {broaching with working tools mounted on an endless chain or belt}  | 19/005       | . . {using a face-mill-type tool, e.g. a milling or a grinding tool}   |
| <b>7/00</b>  | <b>Making herringbone gear teeth</b>  | 19/007       | . . {using a gear-shaped tool}   |
| <b>9/00</b>  | <b>Making gears having teeth curved in their longitudinal direction</b>   | 19/02        | . Lapping gear teeth   |
| 9/003        | . {by broaching}  | 19/025       | . . {Lapping bevel gears by making use of a correspondingly shaped counterpart}  |
| 9/006        | . . {broaching with working tools mounted on an endless chain or belt}  | 19/04        | . . Lapping spur gears by making use of a correspondingly shaped counterpart   |
| 9/02         | . by grinding   | 19/045       | . . . {the counterpart having internal toothing}   |
| 9/025        | . . {with a face-mill-type, i.e. cup-shaped, grinding wheel}  | 19/05        | . Honing gear teeth  |
| 9/04         | . by planing or slotting with reciprocating cutting tools   | 19/052       | . . {by making use of a tool in the shape of a worm}   |
| 9/06         | . . having a shape similar to a spur-wheel or part thereof  | 19/055       | . . {by making use of a tool in the shape of a bevel gear or a crown gear}   |
| 9/07         | . . having a shape similar to a crown wheel or a part thereof   | 19/057       | . . {by making use of a tool in the shape of an internal gear}   |
| 9/08         | . by milling, e.g. with helicoidal hob  | 19/06        | . Shaving the faces of gear teeth  |
| 9/082        | . . {with a hob}  | 19/063       | . . {by making use of a tool in the shape of an internal gear}   |
| 9/084        | . . . {the hob being tapered}   | 19/066       | . . {with plural tools}  |
| 9/086        | . . {with two or more tools}  | 19/10        | . Chamfering the end edges of gear teeth   |
| 9/088        | . . . {the tools being interlocked}   | 19/101       | . . {by planing}   |
| 9/10         | . . with a face-mill  | 19/102       | . . {by milling}   |
| 9/105        | . . . {with continuous indexing, i.e. with continuous work rotation}  | 19/104       | . . . {the tool being a hob}   |
| 9/12         | . . . for non-continuous generating processes   | 19/105       | . . . {the tool being an end mill}   |
| 9/14         | . . . for continuous generating processes   | 19/107       | . . . {the tool being a fly cutter}  |
| <b>11/00</b> | <b>Making worm wheels, e.g. by hobbing</b>  | 19/108       | . . {by brushing}  |
| <b>13/00</b> | <b>Making worms by methods essentially requiring the use of machines of the gear-cutting type (<a href="#">making screw-thread B23G</a>)</b>                                  | 19/12        | . . by grinding  |
| 13/003       | . {making worms of conical or barrel shape}   | 19/125       | . . . {the tool being a grinding worm}   |
| 13/006       | . . {by grinding}   | <b>21/00</b> | <b>Tools specially adapted for use in machines for manufacturing gear teeth</b>  |
| 13/02        | . Making worms of cylindrical shape   | 21/005       | . {with plural tools on a common axis}   |
| 13/04        | . . by grinding   | 21/02        | . Grinding discs; Grinding worms ( <a href="#">truing grinding tools B24B</a> ; <a href="#">grinding tools in general B24D</a> ) |
| 13/06        | . Making worms of globoidal shape   | 21/023       | . . {Face-mill-type, i.e. cup-shaped, grinding wheels}   |
| 13/08        | . . by grinding   | 21/026       | . . {Grinding worms}   |
| <b>15/00</b> | <b>Methods or machines for making gear wheels of special kinds not covered by groups <a href="#">B23F 7/00</a> - <a href="#">B23F 13/00</a></b>                               | 21/03        | . Honing tools   |
| 15/005       | . {Making sprocket teeth}   | 21/035       | . . {Honing worms}   |
| 15/02        | . Making gear teeth on wheels of varying radius of operation, e.g. on elliptical wheels   | 21/04        | . Planing or slotting tools  |
| 15/04        | . Making fine-pitch gear teeth on clock wheels or the like by special machining   | 21/043       | . . {with inserted cutting elements}   |
| 15/06        | . Making gear teeth on the front surface of wheels, e.g. for clutches or couplings with toothed faces   | 21/046       | . . . {in exchangeable arrangement}  |
| 15/08        | . Making intermeshing rotors, e.g. of pumps   | 21/06        | . . having a profile which matches a gear tooth profile  |
|              |   | 21/063       | . . . {with inserted cutting elements}   |
|              |   | 21/066       | . . . . {in exchangeable arrangement}  |
|              |   | 21/08        | . . having the same profile as a tooth or teeth of a rack  |
|              |   | 21/083       | . . . {with inserted cutting elements}   |
|              |   | 21/086       | . . . . {in exchangeable arrangement}  |

- 21/10 . . Gear-shaper cutters having a shape similar to a spur wheel or part thereof
- 21/103 . . . {with inserted cutting elements}
- 21/106 . . . . {in exchangeable arrangement}
- 21/12 . Milling tools
- 21/122 . . {having a shape similar to that of a gear or part thereof, with cutting edges situated on the tooth contour lines}
- 21/124 . . {with cutting teeth disposed on the inner periphery of a ring}
- 21/126 . . {with inserted cutting elements}
- 21/128 . . . {in exchangeable arrangement}
- 21/14 . . Profile cutters of disc type
- 21/143 . . . {with inserted cutting elements}
- 21/146 . . . . {in exchangeable arrangement}
- 21/16 . . Hobs
- 21/163 . . . {with inserted cutting elements}
- 21/166 . . . . {in exchangeable arrangement}
- 21/18 . . . Taper hobs, e.g. for bevel gears
- 21/183 . . . . {with inserted cutting elements}
- 21/186 . . . . . {in exchangeable arrangement}
- 21/20 . . Fly cutters
- 21/203 . . . {with inserted cutting elements}
- 21/206 . . . . {in exchangeable arrangement}
- 21/22 . . Face-mills for longitudinally-curved gear teeth
- 21/223 . . . {with inserted cutting elements}
- 21/226 . . . . {in exchangeable arrangement}
- 21/23 . . . with cutter teeth arranged on a spiral curve for continuous generating processes
- 21/233 . . . . {with inserted cutting elements}
- 21/236 . . . . . {in exchangeable arrangement}
- 21/24 . Broach-milling tools
- 21/241 . . {with inserted cutting elements}
- 21/243 . . . {in exchangeable arrangement}
- 21/245 . . {Face broach mills}
- 21/246 . . . {with inserted cutting elements}
- 21/248 . . . . {in exchangeable arrangement}
- 21/26 . Broaching tools
- 21/262 . . {with inserted cutting elements ([B23F 21/266 and B23F 21/268 take precedence](#))}
- 21/264 . . . {in exchangeable arrangement}
- 21/266 . . {mounted on an endless chain or belt}
- 21/268 . . {Pot broaches}
- 21/28 . Shaving cutters
- 21/282 . . {with inserted cutting elements}
- 21/284 . . . {in exchangeable arrangement}
- 21/286 . . {having the shape of an internal gear}
- 21/288 . . {the cutting edges on consecutive teeth being helically arranged}
- 23/00 Accessories or equipment combined with or arranged in, or specially designed to form part of, gear-cutting machines (tool-guiding mechanisms, [see the relevant groups for making gear teeth](#); accessories or equipment not restricted to gear-cutting machines [B23Q](#))**
- 23/003 . {Generating mechanisms}
- 23/006 . {Equipment for synchronising movement of cutting tool and workpiece, the cutting tool and workpiece not being mechanically coupled}
- 23/02 . Loading, {unloading} or chucking arrangements for workpieces
- 23/04 . . Loading {or unloading} arrangements
- 23/06 . . Chucking arrangements
- 23/08 . Index mechanisms
- 23/085 . . {of the continuous type}
- 23/10 . Arrangements for compensating irregularities in drives or indexing mechanisms
- 23/12 . Other devices, e.g. tool holders; Checking devices for controlling workpieces in machines for manufacturing gear teeth
- 23/1206 . . {Tool mountings}
- 23/1212 . . . {using fluid pressure means}
- 23/1218 . . {Checking devices for controlling workpieces in machines for manufacturing gear teeth}
- 23/1225 . . {Arrangements of abrasive wheel dressing devices on gear-cutting machines ([dressing devices per se B24B 53/00](#))}
- 23/1231 . . . {using a gear-shaped dressing tool}
- 23/1237 . . {Tool holders}
- 23/1243 . . . {Hob holders}
- 23/125 . . . {Face mill holders}
- 23/1256 . . . {Rack cutter holders}
- 23/1262 . . . {Grinding disc holders; Disc-type milling-cutter holders}
- 23/1268 . . . {Face-mill-type grinding wheel holders}
- 23/1275 . . . {Grinding or honing worm holders}
- 23/1281 . . . {Honing, shaving or lapping tool holders}
- 23/1287 . . . {Pinion shaper cutter holders}
- 23/1293 . . {Workpiece heads}