CPC COOPERATIVE PATENT CLASSIFICATION

B23B TURNING; BORING (arrangements for copying or controlling B23Q)

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

B23B 3/18 covered by B23B 3/16
B23B 3/20 covered by B23B 3/16
B23B 3/28 covered by B23B 3/00
B23B 5/22 covered by B23B 31/00
B23B 5/24 covered by B23Q 27/00; B23B 35/00
B23B 5/30 covered by B23Q 35/00
B23B 5/34 covered by B23B 31/00; B23B 33/00
B23B 5/42 covered by B23Q 35/00
B23B 5/44 covered by B23Q 27/00
B23B 7/08 covered by B23B 7/04
B23B 7/14 covered by B23B 7/12
B23B 7/16 covered by B23B 7/12
B23B 9/04 covered by B23B 9/02
B23B 9/06 covered by B23B 9/02
B23B 9/10 covered by B23B 9/08
B23B 9/12 covered by B23B 9/08
B23B 15/00 covered by B23Q 7/00
B23B 17/00 covered by B23Q 1/01; B23Q 1/03; B23Q 1/25
B23B 19/00 covered by B23Q 1/70
B23B 19/02 covered by B23Q 1/70
B23B 21/00 covered by B23Q 1/00
B23B 29/30 covered by B23B 29/28
B23B 31/163 covered by B23B 31/16004
B23B 31/165 covered by B23B 31/16045
B23B 31/167 covered by B23B 31/16045
B23B 31/169 covered by B23B 31/16083
B23B 31/171 covered by B23B 31/1612
B23B 31/173 covered by B23B 31/16158
B23B 31/175 covered by B23B 31/16195
B23B 31/177 covered by B23B 31/16233
B23B 41/08 covered by F16L 41/04
B23B 45/14 covered by B25H 1/0021
B23B 45/16 covered by B25D 16/00
B23B 47/02 covered by B23Q 5/00
B23B 47/04 covered by B23Q 5/00
B23B 47/06 covered by B23Q 5/00
B23B 47/08 covered by B23Q 5/00
B23B 47/10 covered by B23Q 5/00
B23B 47/12 covered by B23Q 5/00
B23B 47/14 covered by B23Q 5/00
B23B 47/16 covered by B23Q 5/00
B23B 47/18 covered by B23Q 5/00
B23B 47/20 covered by B23Q 5/00
B23B 47/22 covered by B23Q 5/00
B23B 47/24 covered by B23Q 16/00

Guidance heading: **Turning**

B23B 1/00 **Methods for turning or working essentially requiring the use of turning-machines; Use of auxiliary equipment in connection with such methods**

B23B 3/00 **General-purpose turning-machines or devices, e.g. centre lathes with feed rod and lead screw; Sets of turning-machines**

B23B 3/02 . Small lathes, e.g. for toolmakers (specially designed for watchmakers G04D 3/00)

B23B 3/04 . Turning-machines in which the workpiece is rotated by means at a distance from the headstock

B23B 3/06 . Turning-machines or devices characterised only by the special arrangement of constructional units (B23Q 37/00 takes precedence; structural features of details, see the relevant groups; such features of general applicability B23Q)

B23B 3/065 . . {Arrangements for performing other machining operations, e.g. milling, drilling }

B23B 3/08 . Turning-machines characterised by the use of faceplates

B23B 3/10 . . with the faceplate horizontal, i.e. vertical boring and turning machines

B23B 3/12 . . with the faceplate vertical, i.e. face lathes

B23B 3/14 . . Mountings or drives of faceplates { (rotatable members, e.g. faceplates B23Q 1/50) }

B23B 3/16 . Turret lathes for turning individually-chucked workpieces { (turrets B23B 29/24) }

B23B 3/161 . . {lathe with one toolslide carrying one turret head }

B23B 3/162 . . . {Arrangements for performing other machining operations, e.g. milling, drilling }

B23B 3/164 . . {lathe with one toolslide carrying two or more turret heads }

B23B 3/165 . . . {Arrangements for performing other machining operations, e.g. milling, drilling }

B23B 3/167 . . {lathe with two or more toolslides carrying turrets }

B23B 3/168 . . . {Arrangements for performing other machining operations, e.g. milling, drilling }

B23B 3/22 . Turning-machines or devices with rotary tool heads { (B23B 5/08, B23B 5/14 and B23B 5/16 take precedence) }

B23B 3/24 . . the tools of which do not perform a radial movement; Rotary tool heads therefor

B23B 3/26 . . the tools of which perform a radial movement; Rotary tool heads thereof

B23B 3/265 . . . {Surfacing or grooving flanges }

B23B 3/30 . Turning-machines with two or more working-spindles, e.g. in fixed arrangement

B23B 3/32 . . for performing indentical operations simultaneously on two or more workpieces

B23B 3/34 . Short turning-machines with one or multiple working-spindles attended from the end (B23B 3/12 takes precedence)

B23B 3/36 . Associations of only turning-machines directed to a particular metal-working result (if the metal-working result is not essential B23Q 39/00)

B23B 5/00 **Turning-machines or devices specially adapted for particular work; Accessories specially adapted therefor**

B23B 5/02 . for turning hubs or brake drums (B23B 5/04 takes precedence)

B23B 5/04 . for reconditioning hubs or brake drums or axle spindles without removing same from

the vehicle

B23B 5/06 . for turning valves or valve bodies { (turning conical surfaces in general B23B 5/38; tools for working valve seats B23B 51/106) }

B23B 5/08 . for turning axles, bars, rods, tubes, rolls, i.e. shaft-turning lathes, roll lathes; Centreless turning

B23B 5/10 . . for turning pilgrim rolls

B23B 5/12 . . for peeling bars or tubes by making use of cutting bits arranged around the workpiece (otherwise than by turning B23D 79/12)

B23B 5/14 . Cutting-off lathes (shearing B23D) {B23D 21/00 takes precedence }

B23B 5/16 . for bevelling, chamfering, or deburring the ends of bars or tubes

B23B 5/161 . . {Devices attached to the workpiece }

B23B 5/162 . . . {with an internal clamping device }

B23B 5/163 . . . {with an external clamping device }

B23B 5/165 . . {Workpieces clamped on a bench, e.g. a vice }

B23B 5/166 . . {Devices for working electrodes }

B23B 5/167 . . {Tools for chamfering the ends of bars or tubes }

B23B 5/168 . . . {with guiding devices }

B23B 5/18 . for turning crankshafts, eccentrics, or cams, e.g. crankpin lathes

B23B 5/20 . . without removing same from the engine

B23B 5/26 . for simultaneously turning internal and external surfaces of a body

B23B 5/28 . for turning wheels or wheel sets or cranks thereon, i.e. wheel lathes

B23B 5/32 . . for reconditioning wheel sets without removing same from the vehicle; Underfloor wheel lathes for railway vehicles

B23B 5/36 . for turning specially-shaped surfaces by making use of relative movement of the tool and work produced by geometrical mechanisms, i.e. forming-lathes

B23B 5/365 . . {for toroidal surfaces }

B23B 5/38 . . for turning conical surfaces inside or outside, e.g. taper pins { (for turning valves or valve bodies B23B 5/06) }

B23B 5/40 . . for turning spherical surfaces inside or outside

B23B 5/46 . . for turning helical or spiral surfaces (thread cutting B23G)

B23B 5/48 . . . for cutting grooves, e.g. oil grooves of helicoidal shape

B23B 7/00 **Automatic or semi-automatic turning-machines with a single working-spindle, e.g. controlled by cams; Equipment therefor; Features common to automatic and semi-automatic turning-machines with one or more working-spindles** { (arrangements or accessories for enabling machine tools not specially designed only for thread cutting to be used for this purpose B23G 3/00) }

B23B 7/02 . Automatic or semi-automatic machines for turning of stock

B23B 7/04 . . Turret machines

B23B 7/06 . . with sliding headstock

B23B 7/10 . . Accessories, e.g. guards { (guards B23Q 11/08 takes precedence) }

B23B 7/12 . Automatic or semi-automatic machines for turning of workpieces

B23B 9/00 **Automatic or semi-automatic turning-machines with a plurality of working-spindles, e.g. automatic multiple-spindle machines with spindles arranged in a drum carrier able to be moved into predetermined positions; Equipment therefor** (equipment applicable to single-spindle machines B23B 7/00)

B23B 9/005 . {Spindle carriers: constructional details, drives for the spindles, or the like }

B23B 9/02 . Automatic or semi-automatic machines for turning of stock

B23B 9/08 . Automatic or semi-automatic machines for turning of workpieces

B23B 11/00 **Automatic or semi-automatic turning-machines incorporating equipment for performing other working procedures, e.g. slotting, milling, rolling** { (B23B 3/065 and B23B 3/16 take precedence; machines incorporating a plurality of sub- assemblies, each capable of performing a metal-working operation, the sub-assemblies being arranged to operate simultaneously at different stations B23Q 39/04) }

B23B 13/00 **Arrangements for automatically conveying or chucking or guiding stock**

B23B 13/02 . for turning-machines with a single working-spindle

B23B 13/021 . . {Feeding device having intermittent movement }

B23B 13/022 . . . {being placed in the spindle }

B23B 13/024 . . . . {including two collets }

B23B 13/025 . . {with stock drum }

B23B 13/027 . . {Feeding by pistons under fluid-pressure }

B23B 13/028 . . {the material being fed from a reel }

B23B 13/04 . for turning-machines with a plurality of working-spindles

B23B 13/06 . Arrangements for switching-off the drive of turning-machines after the stock has been completely machined

B23B 13/08 . Arrangements for reducing vibrations in feeding-passages or for damping noise (damping noise in general G10K)

B23B 13/10 . with magazines for stock

B23B 13/12 . Accessories, e.g. stops, grippers

B23B 13/121 . . {Stops (stops for equipment for precise positioning of tool or work into particular locations not otherwise provided for B23Q 16/00) }

B23B 13/123 . . {Grippers, pushers or guiding tubes (arrangements for reducing vibrations in feeding-passages or for damping noise B23B 13/08) }

B23B 13/125 . . . {Feed collets (feeding device having intermittent movement being placed in the spindle including two collets B23B 13/024; collet chucks B23B 31/20) }

B23B 13/126 . . {Supports }
B23B 13/128 . . {Stock rest handling devices, e.g. ejectors }

Guidance heading: **Components or accessories particularly for turning machines**

B23B 23/00 **Tailstocks; Centres** { (for grinding machines B24B 41/062) }

B23B 23/005 . {the centres being adjustable }

B23B 23/02 . Dead centres
B23B 23/025 . . {the centres being adjustable }

B23B 23/04 . Live centres
B23B 23/045 . . {the centres being adjustable }

B23B 25/00 **Accessories or auxiliary equipment for turning-machines** (for machine tools in general B23Q ; cooling or lubricating B23Q 11/12)

B23B 25/02 . Arrangements for chip-breaking in turning-machines (on cutting tools B23B 27/22)

B23B 25/04 . Safety guards specially designed for turning machines ({B23Q 11/08 takes precedence; } in general F16P)

B23B 25/06 . Measuring, gauging, or adjusting equipment on turning-machines for setting-on, feeding, controlling, or monitoring the cutting tools or work (measuring devices or gauges G01B)
B23B 25/065 . . {Tool setting height gauges }

B23B 27/00 **Tools for turning or boring machines** (for drilling machines B23B 51/00) **; Tools of a similar kind in general; Accessories therefor** {Note: all subgroups except B23B 27/12 relate to tools with a shank }

B23B 27/002 . {with vibration damping means }

B23B 27/005 . {Geometry of the chip-forming or the clearance planes, e.g. tool angles (B23B 27/141 and B23B 27/22 take precedence) }

B23B 27/007 . {for internal turning (boring bars B23B 29/02, boring heads B23B 29/03; milling cutters B23C 5/00; reamers B23D 77/00) }

B23B 27/02 . Cutting tools with straight main part and cutting edge at an angle (B23B 27/04 to B23B 27/08 take precedence)

B23B 27/04 . Cutting-off tools (B23B 27/08 takes precedence; {toolholders for cutting-off inserts B23B 29/043 })
B23B 27/045 . . {with chip-breaking arrangements }

B23B 27/06 . profile cutting tools, i.e. forming-tools
B23B 27/065 . . {Thread-turning tools }

B23B 27/08 . Cutting tools with blade- or disc-like main parts { (with disc-like main parts B23B 27/083) }

B23B 27/083 .. {Cutting tools with disc-like main parts }

B23B 27/086 .. {with yieldable support for the cutting insert }

B23B 27/10 . Cutting tools with special provision for cooling { (drills with lubricating or cooling equipment B23B 51/06; features relating to lubricating or cooling of milling cutters B23C 5/28; arrangements or devices for cooling or lubricating tools or work B23Q 11/10) }

B23B 27/12 .. with a continuously-rotated circular cutting edge; holders therefor

B23B 27/14 . Cutting tools of which the bits or tips {or cutting inserts } are of special material

B23B 27/141 .. {Specially shaped plate-like cutting inserts, i.e. length greater or equal to width, width greater than or equal to thickness (with specially shaped plate-like exchangeable cutting inserts, e.g. chip-breaking groove, B23B 27/1603; with removable plate-like milling cutting inserts of special shape B23C 5/202) }

B23B 27/143 ... {characterised by having chip-breakers }

B23B 27/145 ... {characterised by having a special shape }

B23B 27/146 .... {Means to improve the adhesion between the substrate and the coating }

B23B 27/148 .. {Composition of the cutting inserts }

B23B 27/16 .. with exchangeable cutting bits {or cutting inserts }, e.g. able to be clamped

B23B 27/1603 ... {with specially shaped plate-like exchangeable cutting inserts, e.g. chip-breaking groove (B23B 27/1614 to B23B 27/1655 take precedence) }

B23B 27/1607 .... {characterised by having chip-breakers }

B23B 27/1611 .... {characterised by having a special shape }

B23B 27/1614 ... {with plate-like cutting inserts of special shape clamped against the walls of the recess in the shank by a clamping member acting upon the wall of a hole in the insert (B23B 27/1644 takes precedence) }

B23B 27/1618 .... {characterised by having chip-breakers }

B23B 27/1622 .... {characterised by having a special shape }

B23B 27/1625 ... {with plate-like cutting inserts of special shape clamped by a clamping member acting almost perpendicularly on the chip-forming plane (B23B 27/1644 takes precedence) }

B23B 27/1629 .... {in which the clamping member breaks the chips }

B23B 27/1633 .... {in which the chip-breaking clamping member is adjustable }

B23B 27/1637 .... {characterised by having chip-breakers }

B23B 27/164 .... {characterised by having a special shape }

B23B 27/1644 ... {with plate-like cutting inserts of special shape clamped by a clamping member acting almost perpendicularly on the chip-forming plane and at the same time upon the wall of a hole in the cutting insert }

B23B 27/1648 .... {characterised by having chip-breakers }

B23B 27/1651 .... {characterised by having a special shape }

B23B 27/1655 ... {Adjustable position of the plate-like cutting inserts of special form }

B23B 27/1659 ... {with plate-like exchangeable cutting inserts (B23B 27/1662 to B23B 27/1681 take precedence) }

B23B 27/1662 ... {with plate-like cutting inserts clamped against the walls of the recess in the shank by a clamping member acting upon the wall of a hole in the cutting insert

(B23B 27/1677 takes precedence) }

B23B 27/1666 . . . {with plate-like cutting inserts clamped by a clamping member acting almost perpendicularly on chip-forming plane (B23B 27/1677 takes precedence) }

B23B 27/167 . . . . {in which the clamping member breaks the chips }

B23B 27/1674 . . . . {in which the chip-breaking clamping member is adjustable }

B23B 27/1677 . . . {with plate-like cutting inserts clamped by a clamping member acting almost perpendicularly on the chip-forming plane and at the same time upon the wall of a hole in the insert }

B23B 27/1681 . . . {Adjustable position of the plate-like cutting inserts }

B23B 27/1685 . . . {Adjustable position of the cutting inserts (B23B 27/1655 and B23B 27/1681 take precedence) }

B23B 27/1688 . . . . {Height of the cutting tip adjustable }

B23B 27/1692 . . . . {Angular position of the cutting insert adjustable around an axis parallel to the chip-forming plane }

B23B 27/1696 . . . . {Angular position of the cutting insert adjustable around an axis generally perpendicularly to the chip-forming plane }

B23B 27/18 . . with cutting bits or tips {or cutting inserts } rigidly mounted, e.g. by brazing

B23B 27/20 . . . with diamond bits {or cutting inserts }

B23B 27/22 . Cutting tools with chip-breaking equipment { (B23B 27/045, B23B 27/143, B23B 27/16 take precedence; arrangements for chip-breaking B23B 25/02; for milling tools B23C 5/165) }

B23B 27/24 . Knurling tools

B23B 29/00 **Holders for non-rotary cutting tools** (B23B 27/12 takes precedence) **; Boring bars or boring heads; Accessories for tool holders**

B23B 29/02 . Boring bars

B23B 29/022 . . {with vibration reducing means }

B23B 29/025 . . {Boring toolholders fixed on the boring bar }

B23B 29/027 . . {Steadies for boring bars (auxiliary devices, e.g. steadies, rests B23Q 1/76) }

B23B 29/03 . Boring heads

B23B 29/034 . . with tools moving radially, e.g. for making chamfers or undercuttings

B23B 29/03403 . . . {radially adjustable before starting manufacturing }

B23B 29/03407 . . . . { by means of screws and nuts }

B23B 29/0341 . . . . . { Cartridges }

B23B 29/03414 . . . . . { adjustment of the tool placed in the hole being possible }

B23B 29/03417 . . . . { by means of inclined planes }

B23B 29/03421 . . . . { by pivoting the tool carriers or by elastic deformation }

B23B 29/03425 . . . . { by means of gears and racks }

B23B 29/03428 . . . . { by means of an eccentric }

B23B 29/03432 . . . {radially adjustable during manufacturing }

B23B 29/03435 . . . . { by means of screws and nuts }

B23B 29/03439 . . . . . { Boring and facing heads }

B23B 29/03442 . . . . . { Grooving tool }
B23B 29/03446 . . . . { by means of inclined planes }
B23B 29/0345 . . . . . { Boring and facing heads }
B23B 29/03453 . . . . . { Grooving tool }
B23B 29/03457 . . . . { by pivoting the tool carriers or by elastic deformation }
B23B 29/0346 . . . . . { Boring and facing heads }
B23B 29/03464 . . . . . { Grooving tool }
B23B 29/03467 . . . . { by means of gears and racks }
B23B 29/03471 . . . . . { Boring and facing heads }
B23B 29/03475 . . . . . { Grooving tool }
B23B 29/03478 . . . . { by means of an eccentric }
B23B 29/03482 . . . . . { Boring and facing heads }
B23B 29/03485 . . . . . { Grooving tool }
B23B 29/03489 . . . . { Adjustment means not specified or not covered by the groups B23B 29/03435 to B23B 29/03478 }
B23B 29/03492 . . . . . { Boring and facing heads }
B23B 29/03496 . . . . . { Grooving tool }

B23B 29/04 . Tool holders for a single cutting tool
B23B 29/043 . . {with cutting-off, grooving or profile cutting tools, i.e. blade- or disc-like main cutting parts (B23B 29/14 takes precedence) }
B23B 29/046 . . {with an intermediary toolholder }
B23B 29/06 . . Tool holders equipped with longitudinally-arranged grooves for setting the cutting tool
B23B 29/08 . . Tool holders equipped with grooves arranged crosswise to the longitudinal direction for setting the cutting tool
B23B 29/10 . . . with adjustable counterbase for the cutting tool
B23B 29/12 . . Special arrangements on tool holders
B23B 29/125 . . . {Vibratory toolholders }
B23B 29/14 . . . affording a yielding support of the cutting tool, e.g. by spring clamping { (cutting tools with yieldable support for the cutting insert B23B 27/086) }
B23B 29/16 . . . for supporting the workpiece in a backrest
B23B 29/18 . . . for retracting the cutting tool
B23B 29/20 . . . for placing same by shanks in sleeves of a turret
B23B 29/205 . . . . {the tools being adjustable }
B23B 29/22 . . . for tool adjustment by means of shims or spacers

B23B 29/24 . Tool holders for a plurality of cutting tools, e.g. turrets { (indexing devices B23Q 16/00) }
B23B 29/242 . . {Turrets, without description of the angular positioning device (turret lathes for turning individually-chucked workpieces B23B 3/16; turrets with manually operated angular positioning devices B23B 29/282; turrets with power operated angular positioning devices B23B 29/323) }

B23B 29/244 . . {Toolposts, i.e. clamping quick-change toolholders, without description of the angular positioning device (toolposts with manually operated angular positioning devices B23B 29/285; toolposts with power operated angular positioning devices B23B 29/326) }

B23B 29/246 . . . {Quick-change tool holders }

B23B 29/248 . . {with individually adjustable toolholders }

B23B 29/26 . . Tool holders in fixed position

B23B 29/28 . . Turrets manually adjustable about a vertical { or horizontal } pivot { (indexing devices B23Q 16/00) }

B23B 29/282 . . . {Turrets with manually operated angular positioning devices }

B23B 29/285 . . . {Toolposts with manually operated angular positioning devices }

B23B 29/287 . . . {Turret toolholder with manually operated angular positioning devices }

B23B 29/32 . . Turrets adjustable by power drive, i.e. turret heads { (indexing devices B23Q 16/00) }

B23B 29/323 . . . {Turrets with power operated angular positioning devices }

B23B 29/326 . . . {Toolposts with power operated angular positioning devices }

B23B 29/34 . . Turrets equipped with triggers for releasing the cutting tools

B23B 31/00 **Chucks** { (allowing axial oscillation of percussion tool bits B25D 17/08) }**; Expansion mandrels; Adaptations thereof for remote control** (faceplates B23Q 1/50; devices for securing work or tools to spindles in general B23Q 3/12; rotary devices holding by magnetic and/or electrical force acting directly on work B23Q 3/152)

B23B 31/001 . {Protection against entering of chips or dust }

B23B 31/003 . {Work or tool ejection means }

B23B 31/005 . {Cylindrical shanks of tools }

B23B 31/006 . {Conical shanks of tools }

B23B 31/008 . {with arrangements for transmitting torque }

B23B 31/02 . Chucks

B23B 31/021 . . {Faceplates }

B23B 31/023 . . {for screw-threads }

B23B 31/025 . . {for gears }

B23B 31/026 . . {the radial or angular position of the tool being adjustable (boring heads with tools moving radially B23B 29/034; holding tools yieldably B23B 31/08; with means for adjusting the chuck with respect to the working spindle B23B 31/36) }

B23B 31/028 . . {the axial positioning of the tool being adjustable (B23B 31/208 takes precedence; with means for adjusting the chuck with respect to the working spindle B23B 31/36) }

B23B 31/06 . . Features relating to the removal of tools; Accessories therefor

B23B 31/07 . . . Ejector wedges

B23B 31/08 . . Holding tools yieldably

B23B 31/083 . . . {axially }

B23B 31/086 . . . . {having an overload clutch }

B23B 31/10 . . characterised by the retaining or gripping devices or their immediate operating means

NOTE

Group B23B 31/12 takes precedence over groups { B23B 31/10B, B23B 31/10C, } B23B 31/103 to B23B 31/117

B23B 31/101 . . . {Chucks with separately-acting jaws movable radially (B23B 31/1602, B23B 31/16062, B23B 31/161, B23B 31/16137, B23B 31/16175, B23B 31/16212, B23B 31/1625 and B23B 31/16283 take precedence; Chucks with simultaneously-acting jaws moving radially B23B 31/16) }

B23B 31/102 . . . {Jaws, accessories or adjustment means (B23B 31/16008, B23B 31/1605, B23B 31/16087, B23B 31/16125, B23B 31/16162, B23B 31/162, B23B 31/16237, B23B 31/1627 take precedence) }

B23B 31/103 . . . Retention by pivotal elements, e.g. catches, pawls

B23B 31/107 . . . Retention by laterally-acting detents, e.g. pins, screws, wedges; Retention by loose elements, e.g. balls

B23B 31/1071 . . . . {Retention by balls (balls acting as jaws B23B 31/22) }

B23B 31/1072 . . . . {Retention by cylindrical elements (cylindrical elements acting as jaws B23B 31/22) }

B23B 31/1073 . . . . {Retention by conical elements (conical elements acting as jaws B23B 31/22) }

B23B 31/1074 . . . . {Retention by pins }

B23B 31/1075 . . . . {Retention by screws }

B23B 31/1076 . . . . . {with conical ends }

B23B 31/1077 . . . . . {acting on a floating pin }

B23B 31/1078 . . . . {Retention by wedges }

B23B 31/11 . . . Retention by threaded connection

B23B 31/1107 . . . . {for conical parts }

B23B 31/1115 . . . . . { using conical threads }

B23B 31/1122 . . . . . { using cylindrical threads }

B23B 31/113 . . . Retention by bayonet connection

B23B 31/117 . . . Retention by friction only, e.g. using springs, resilient sleeves, tapers

B23B 31/1171 . . . . {not used, see subgroups and B23B 31/117 }

B23B 31/1172 . . . . . {using fluid-pressure means to actuate the gripping means }

B23B 31/1173 . . . . {using springs }

B23B 31/1174 . . . . . {using fluid-pressure means to actuate the gripping means }

B23B 31/1175 . . . . {using elastomer rings or sleeves }

B23B 31/1176 . . . . . {using fluid-pressure means to actuate the gripping means }

B23B 31/1177 . . . . {using resilient metallic rings or sleeves }

B23B 31/1178 . . . . . {using fluid-pressure means to actuate the gripping means }

B23B 31/1179 . . . . { using heating and cooling }

B23B 31/12 . . . Chucks with simultaneously-acting jaws, whether or not also individually adjustable

B23B 31/1207 . . . . {moving obliquely to the axis of the chuck in a plane containing this axis }

B23B 31/1215 . . . . . {Details of the jaws }

B23B 31/1223	. . . . .	{using fluid-pressure means in the chuck to actuate the gripping means }
B23B 31/123	. . . . .	{with locking arrangements (locking arrangements for chucks with simultaneously-acting jaws moving radially actuated by one or more spiral grooves B23B 31/16041) }
B23B 31/1238	. . . . .	{Jaws movement actuated by a nut with conical screw-thread }
B23B 31/1246	. . . . .	{Jaws movement actuated by a bolt with conical screw-thread }
B23B 31/1253	. . . . .	{Jaws movement actuated by an axially movable member }
B23B 31/1261	. . . .	{pivotally movable in a radial plane }
B23B 31/1269	. . . . .	{Details of the jaws }
B23B 31/1276	. . . . .	{using fluid-pressure means to actuate the gripping means }
B23B 31/1284	. . . . .	{with a centre }
B23B 31/1292	. . . . .	{using mechanical transmission through the spindle }
B23B 31/14	. . . .	involving the use of a centrifugal force
B23B 31/16	. . . .	moving radially
B23B 31/16004	. . . . .	{Jaws movement actuated by one or more spiral grooves }
B23B 31/16008	. . . . .	{Details of the jaws }
B23B 31/16012	. . . . .	{Form of the jaws }
B23B 31/16016	. . . . .	{Fixation on the master jaw }
B23B 31/1602	. . . . .	{Individually adjustable jaws }
B23B 31/16025	. . . . .	{using fluid-pressure means to actuate the gripping means }
B23B 31/16029	. . . . .	{using mechanical transmission through the spindle }
B23B 31/16033	. . . . .	{with a centre }
B23B 31/16037	. . . . .	{using mechanical transmission through the spindle (B23B 31/16029 takes precedence) }
B23B 31/16041	. . . . .	{with locking arrangements (locking arrangements for chucks with simultaneously-acting jaws moving obliquely to the axis of the chuck in a plane containing this axis B23B 31/123) }
B23B 31/16045	. . . . .	{Jaws movement actuated by screws and nuts or oblique racks }
B23B 31/1605	. . . . .	{Details of the jaws }
B23B 31/16054	. . . . .	{Form of the jaws }
B23B 31/16058	. . . . .	{Fixation on the master jaw }
B23B 31/16062	. . . . .	{Individually adjustable jaws }
B23B 31/16066	. . . . .	{using fluid-pressure means to actuate the gripping means }
B23B 31/1607	. . . . .	{using mechanical transmission through the spindle }
B23B 31/16075	. . . . .	{with a centre }
B23B 31/16079	. . . . .	{using mechanical transmission through the spindle (B23B 31/1607 takes precedence) }
B23B 31/16083	. . . . .	{Jaws movement actuated by gears and racks }
B23B 31/16087	. . . . .	{Details of the jaws }
B23B 31/16091	. . . . .	{Form of the jaws }
B23B 31/16095	. . . . .	{Fixation on the master jaw }
B23B 31/161	. . . . .	{Individually adjustable jaws }
B23B 31/16104	. . . . .	{using fluid-pressure means to actuate the gripping means }
B23B 31/16108	. . . . .	{using mechanical transmission through the spindle }

B23B 31/16112 ..... {with a centre }
B23B 31/16116 ..... {using mechanical transmission through the spindle (B23B 31/16108 takes precedence) }
B23B 31/1612 ..... {Jaws movement actuated by cam surface in a radial plane }
B23B 31/16125 ..... {Details of the jaws }
B23B 31/16129 ..... {Form of the jaws }
B23B 31/16133 ..... {Fixation on the master jaw }
B23B 31/16137 ..... {Individually adjustable jaws }
B23B 31/16141 ..... {using fluid-pressure means to actuate the gripping means }
B23B 31/16145 ..... {using mechanical transmission through the spindle }
B23B 31/1615 ..... {with a centre }
B23B 31/16154 ..... {using mechanical transmission through the spindle (B23B 31/16145 takes precedence) }
B23B 31/16158 ..... {Jaws movement actuated by coaxial conical surfaces }
B23B 31/16162 ..... {Details of the jaws }
B23B 31/16166 ..... {Form of the jaws }
B23B 31/1617 ..... {Fixation on the master jaw }
B23B 31/16175 ..... {Individually adjustable jaws }
B23B 31/16179 ..... {using fluid-pressure means to actuate the gripping means }
B23B 31/16183 ..... {using mechanical transmission through the spindle }
B23B 31/16187 ..... {with a centre }
B23B 31/16191 ..... {using mechanical transmission through the spindle (B23B 31/16183 takes precedence) }
B23B 31/16195 ..... {Jaws movement actuated by levers moved by a coaxial control rod }
B23B 31/162 ..... {Details of the jaws }
B23B 31/16204 ..... {Form of the jaws }
B23B 31/16208 ..... {Fixation on the master jaw }
B23B 31/16212 ..... {Individually adjustable jaws }
B23B 31/16216 ..... {using fluid-pressure means to actuate the gripping means }
B23B 31/1622 ..... {using mechanical transmission through the spindle }
B23B 31/16225 ..... {with a centre }
B23B 31/16229 ..... {using mechanical transmission through the spindle (B23B 31/1622 takes precedence) }
B23B 31/16233 ..... {Jaws movement actuated by oblique surfaces of a coaxial control rod }
B23B 31/16237 ..... {Details of the jaws }
B23B 31/16241 ..... {Form of the jaws }
B23B 31/16245 ..... {Fixation on the master jaw }
B23B 31/1625 ..... {Individually adjustable jaws }
B23B 31/16254 ..... {using fluid-pressure means to actuate the gripping means }
B23B 31/16258 ..... {using mechanical transmission through the spindle }
B23B 31/16262 ..... {with a centre }
B23B 31/16266 ..... {using mechanical transmission through the spindle (B23B 31/16258 takes precedence) }
B23B 31/1627 ..... {Details of the jaws }

B23B 31/16275 . . . . . {Form of the jaws }
B23B 31/16279 . . . . . {Fixation on the master jaw }
B23B 31/16283 . . . . . {Indivudually adjustable jaws }
B23B 31/16287 . . . . . {using fluid-pressure means to actuate the gripping means }
B23B 31/16291 . . . . . {with a centre }
B23B 31/16295 . . . . . {with means preventing the ejection of the jaws }
B23B 31/18 . . . . pivotally movable in planes containing the axis of the chuck
B23B 31/185 . . . . . {moving first parallel to the axis then pivotally in planes containing the axis of the chuck }
B23B 31/19 . . . . moving parallel to the axis of the chuck { (B23B 31/185 takes precedence) }
B23B 31/20 . . . . Longitudinally-split sleeves, e.g. collet chucks
B23B 31/201 . . . . . {characterised by features relating primarily to remote control of the gripping means }
B23B 31/202 . . . . . {Details of the jaws }
B23B 31/204 . . . . . {using fluid-pressure means to actuate the gripping means }
B23B 31/205 . . . . . {using mechanical transmission through the spindle }
B23B 31/207 . . . . . {using mechanical transmission through the spindle (B23B 31/205 takes precedence) }
B23B 31/208 . . . . . { with a tool positioning stop (axial positioning of the tool being adjustable B23B 31/028) }
B23B 31/22 . . . . Jaws in the form of balls { (retention by balls B23B 31/1071) }
B23B 31/223 . . . . . {Jaws in the form of cylindrical elements (Retention by cylindrical elements B23B 31/1072) }
B23B 31/226 . . . . . {Jaws in the form of conical elements (Retention by conical elements B23B 31/1073) }
B23B 31/24 . . characterised by features relating primarily to remote control of the gripping means { (B23B 31/201 takes precedence) }
B23B 31/26 . . . using mechanical transmission through the working-spindle { (B23B 31/16 and B23B 31/40 take precedence) }
B23B 31/261 . . . . {clamping the end of the toolholder shank }
B23B 31/263 . . . . . {by means of balls }
B23B 31/265 . . . . . {by means of collets }
B23B 31/266 . . . . . {using a threaded spindle }
B23B 31/268 . . . . . {using a bayonet connection }
B23B 31/28 . . . using electric or magnetic means in the chuck
B23B 31/30 . . . using fluid-pressure means in the chuck { (B23B 31/10 and B23B 31/40 take precedence) }
B23B 31/302 . . . . {Hydraulic equipment, e.g. pistons, valves, rotary joints }
B23B 31/305 . . . . {the gripping means is a deformable sleeve }
B23B 31/307 . . . . {Vacuum chucks }
B23B 31/32 . . with jaws carried by diaphragm
B23B 31/34 . . with means enabling the workpiece to be reversed or tilted
B23B 31/36 . . with means for adjusting the chuck with respect to the working-spindle
B23B 31/38 . . with overload clutches { (B23B 31/086 takes precedence) }
B23B 31/39 . . Jaw changers

B23B 31/40 . Expansion mandrels

B23B 31/4006 . . {Gripping the work or tool by a split sleeve (collet chucks B23B 31/20) }

B23B 31/4013 . . . {Details of the jaws }

B23B 31/402 . . . {using fluid-pressure means to actuate the gripping means }

B23B 31/4026 . . . . {using mechanical transmission through the spindle }

B23B 31/4033 . . . {using mechanical transmission through the spindle (B23B 31/4026 takes precedence) }

B23B 31/404 . . {Gripping the work or tool by jaws moving radially controlled by conical surfaces (see also B23B 31/16158) }

B23B 31/4046 . . . {Details of the jaws }

B23B 31/4053 . . . {using fluid-pressure means to actuate the gripping means }

B23B 31/406 . . . . {using mechanical transmission through the spindle }

B23B 31/4066 . . . {using mechanical transmission through the spindle (B23B 31/406 takes precedence) }

B23B 31/4073 . . {Gripping the work or tool between planes almost perpendicular to the axis }

B23B 31/408 . . {Work or tool supported by two conical surfaces }

B23B 31/4086 . . {Work or tool gripped by a roller movable on an inclined plane }

B23B 31/4093 . . {Tube supporting means including a centerhole }

B23B 31/42 . . characterised by features relating primarily to remote control of the gripping means

B23B 33/00 **Drivers; Driving centres, Nose clutches, e.g. lathe dogs**

B23B 33/005 . { Drivers with driving pins or the like }

Guidance heading: **Boring; Drilling** (for surgical purposes A61B 17/16; in metal using electric current B23H 9/14; by laser beam B23K 26/00; earth or rock drilling E21B)

B23B 35/00 **Methods for boring or drilling, or for working essentially requiring the use of boring or drilling machines; Use of auxiliary equipment in connection with such methods**

B23B 35/005 . {Measures for preventing splittering }

B23B 37/00 **Boring by making use of ultrasonic energy** (essentially using abrasive material B24B , e.g. B24B 1/04)

B23B 39/00 **General-purpose boring or drilling machines or devices; Sets of boring and/or drilling machines**

B23B 39/003 . {Drilling machine situated underneath the workpiece }

B23B 39/006 . {Portal drilling machines }

B23B 39/02 . Boring machines; Combined horizontal boring and milling machines

B23B 39/04 . Co-ordinate boring or drilling machines; Machines for making holes without previous marking

B23B 39/06 . . Equipment for positioning work

B23B 39/08 . . Devices for programme control

B23B 39/10 . characterised by the drive, e.g. by fluid-pressure drive pneumatic power drive

B23B 39/12 . Radial drilling machines

B23B 39/14 . with special provision to enable the machine or the drilling or boring head to be moved into any desired position, e.g. with respect to immovable work

B23B 39/16 . Drilling machines with a plurality of working-spindles; Drilling automatons

B23B 39/161 . . {with parallel work spindles }

B23B 39/162 . . . {having gear transmissions }

B23B 39/163 . . . {having crank pin transmissions }

B23B 39/165 . . . {having universal joint transmissions }

B23B 39/166 . . . {having flexible shaft transmissions }

B23B 39/167 . . . {having belt and chain transmissions }

B23B 39/168 . . {with the work spindles being oblique to each other }

B23B 39/18 . . Setting work or tool carrier along a straight index line

B23B 39/20 . . Setting work or tool carrier along a circular index line; Turret head drilling machines

B23B 39/205 . . . {Turret head drilling machines }

B23B 39/22 . . with working-spindles in opposite headstocks

B23B 39/24 . . designed for programme control

B23B 39/26 . in which the working position of tool or work is controlled by copying discrete points of a pattern (features of copying devices B23Q 35/02)

B23B 39/28 . Associations of only boring or drilling machines directed to a particular metal-working result (if not producing a particular metal-working result B23Q 39/00)

B23B 41/00 **Boring or drilling machines or devices specially adapted for particular work** { (surgical drilling machines A61B 17/16) }**; Accessories specially adapted therefor**

B23B 41/003 . {for drilling elongated pieces, e.g. beams }

B23B 41/006 . . {the machining device being moved along a fixed workpiece }

B23B 41/02 . for boring deep holes; Trepanning, e.g. of gun or rifle barrels

B23B 41/04 . for boring polygonal or other non-circular holes

B23B 41/06 . for boring conical holes

B23B 41/10 . for boring holes in steam boilers

B23B 41/12 . for forming working surfaces of cylinders, of bearings, e.g. in heads of driving rods, or of other engine parts

B23B 41/14 . for very small holes

B23B 41/16 . for boring holes with high-quality surface

B23B 43/00 **Boring or drilling devices able to be attached to a machine tool, whether or not replacing an operative portion of the machine tool** (if specially adapted for particular work B23B 41/00)

B23B 43/02 . to the tailstock of a lathe

B23B 45/00 **Hand-held or like portable drilling machines, e.g. drill guns; Equipment therefor** (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00)

B23B 45/001 . {Housing of the drill, e.g. handgrip }

B23B 45/003 . {Attachments }

B23B 45/005 . . {Flexible shafts }

B23B 45/006 . {Keys for operating the chucks }

B23B 45/008 . {Gear boxes, clutches, bearings, feeding mechanisms or like equipment }

B23B 45/02 . driven by electric power

B23B 45/04 . driven by fluid-pressure or pneumatic power

B23B 45/042 . . {Turbine motors }

B23B 45/044 . . {Rotary vane type motors }

B23B 45/046 . . {Piston engines }

B23B 45/048 . . . {Internal combustion piston engines }

B23B 45/06 . driven by man-power

B23B 45/08 . . for drilling rails or profiled stock

B23B 45/10 . . by using a fiddle bow or a belt

B23B 45/12 . . by using a ratchet brace

Guidance heading: **Components or accessories for boring or drilling machines**

B23B 47/00 **Constructional features of components specially designed for boring or drilling machines; Accessories therefor** (working-spindles, bearing sleeves therefor B23Q 1/70; for machine tolls in general B23Q)

B23B 47/26 . Liftable or lowerable drill heads or headstocks; Balancing arrangements therefor { (weight and flexion compensation B23Q 11/001) }

B23B 47/28 . Drill jigs for workpieces (equipment for setting or guiding the drill B23B 49/00)

B23B 47/281 . . {Jigs for drilling cylindrical parts }

B23B 47/282 . . {Jigs for drilling spherical parts }

B23B 47/284 . . {Jigs for drilling rivets or bolts }

B23B 47/285 . . {Jigs for drilling ski bindings }

B23B 47/287 . . {Jigs for drilling plate-like workpieces (templates for marking the position of fittings on wings or frames E05D 11/0009) }

B23B 47/288 . . . {involving dowelling }

B23B 47/30 . Additional gear with one or more working-spindles attachable to the main working-spindle and mounting the additional gear { (multi-spindle drilling machines B23B 39/16) }

B23B 47/32 . Arrangements for preventing the running-out of drills or fracture of drills when getting through

B23B 47/34 . Arrangements for removing chips out of the holes made; Chip- breaking arrangements attached to the tool { (chip-breaking in turning machines B23B 25/02; in turning tools B23B 27/22) }

B23B 49/00 **Measuring or gauging equipment on boring machines for positioning or guiding the drill; Devices for indicating failure of drills during boring; Centering devices for holes to be bored** (marking-out equipment B25H 7/00; measuring devices, gauges G01B)

B23B 49/001 . {Devices for detecting or indicating failure of drills }

B23B 49/003 . {Stops attached to drilling tools, tool holders or drilling machines (B23B 51/104 takes precedence) }

B23B 49/005 . . {Attached to the drill }

B23B 49/006 . . {Attached to drilling machines }

B23B 49/008 . . . {Attached to the nose of the drilling machines }

B23B 49/02 . Boring templates or bushings

B23B 49/023 . . {Bushings and their connection to the template }

B23B 49/026 . . {Boring bushing carriers attached to the workpiece by glue, magnets, suction devices or the like }

B23B 49/04 . Devices for boring or drilling centre holes in workpieces

B23B 49/06 . Devices for drilling holes in brake bands or brake linings

B23B 51/00 **Tools for drilling machines** { (for drilling wood B27G 15/00; for drilling stone or stone-like materials, e.g. brick, concrete, glass B28D 1/00; drill bits for earth or rock drilling E21B 10/00) }

B23B 51/0009 . {Spade drills }

B23B 51/0018 . {Drills for enlarging a hole }

B23B 51/0027 . . {by tool swivelling }

B23B 51/0036 . . {by a tool-carrying eccentric }

B23B 51/0045 . . {by expanding or tilting the toolhead }

B23B 51/0054 . {Drill guiding devices }

B23B 51/0063 . {Centerdrills }

B23B 51/0072 . {Drills for making non-circular holes }

B23B 51/0081 . {Conical drills }

B23B 51/009 . {Stepped drills }

B23B 51/02 . Twist drills

B23B 51/04 . Drills for trepanning

B23B 51/0406 . . {Drills with a tubular body (saw cylinders, e.g. having their cutting rim equipped with abrasive particles, for working stone or glass B28D 1/041) }

B23B 51/0413 . . . {with core-cutting-off devices }

B23B 51/042 . . . {with lubricating or cooling equipment }

B23B 51/0426 . . . {with centering devices }

B23B 51/0433 . . . . {with exchangeable cutting inserts, e.g. able to be clamped }

B23B 51/044 . . . {with core holding devices }

B23B 51/0446 . . . . {with exchangeable cutting inserts, e.g. able to be clamped }

B23B 51/0453 . . . {with ejecting devices }

B23B 51/046 . . . . {with exchangeable cutting inserts, e.g. able to be clamped }

B23B 51/0466 . . . {with exchangeable cutting inserts, e.g. able to be clamped }

B23B 51/0473 . . . {details about the connection between the driven shaft and the tubular cutting part }

B23B 51/048 . . {with exchangeable cutting inserts, e.g. able to be clamped (B23B 51/0493 takes precedence) }

B23B 51/0486 . . {with lubricating or cooling equipment (B23B 51/042 takes precedence) }

B23B 51/0493 . . . { with exchangeable cutting inserts, e.g. able to be clamped }

B23B 51/05 . . for cutting discs from sheet

B23B 51/06 . Drills with lubricating or cooling equipment { (B23B 51/042 and B23B 51/0486 take precedence) }

B23B 51/08 . Drills combined with tool parts or tools for performing additional working { (B23G 5/20 takes precedence) }

B23B 51/10 . Bits for countersinking

B23B 51/101 . . {Deburring tools (B23B 51/103 takes precedence) }

B23B 51/102 . . {Back spot-facing or chamfering }

B23B 51/103 . . {Deburring or chamfering tools for the ends of tubes or rods }

B23B 51/104 . . {with stops }

B23B 51/105 . . {Deburring or countersinking of radial holes }

B23B 51/106 . . {with a toolholder moving along a direction oblique to the axis }

B23B 51/107 . . {having a pilot }

B23B 51/108 . . {having a centering twist drill }

B23B 51/12 . Adapters for drills or chucks; Tapered sleeves
B23B 51/123 . . {Conical reduction sleeves }
B23B 51/126 . . {Tool elongating devices }
B23B 51/14 . . Adapters for broken drills

B23B 2200/00 Details of cutting inserts

B23B 2200/04 . Overall shape
B23B 2200/0404 . . Hexagonal
B23B 2200/0409 . . . irregular
B23B 2200/0414 . . . rounded
B23B 2200/0419 . . . trigonal
B23B 2200/0423 . . Irregular
B23B 2200/0428 . . Lozenge
B23B 2200/0433 . . . rounded
B23B 2200/0438 . . Octagonal
B23B 2200/0442 . . . rounded
B23B 2200/0447 . . Parallelogram
B23B 2200/0452 . . . rounded
B23B 2200/0457 . . Pentagonal
B23B 2200/0461 . . Round
B23B 2200/0466 . . Segment or sector of a circle
B23B 2200/0471 . . Square
B23B 2200/0476 . . . rounded
B23B 2200/048 . . Star form
B23B 2200/0485 . . Trapezium
B23B 2200/049 . . Triangular
B23B 2200/0495 . . . rounded

B23B 2200/08 . Rake or top surfaces
B23B 2200/081 . . with projections (chip breaking projections in general B23B 2200/321)
B23B 2200/082 . . with elevated clamping surface
B23B 2200/083 . . curved
B23B 2200/085 . . discontinuous
B23B 2200/086 . . with one or more grooves
B23B 2200/087 . . . for chip breaking (chip breaking depressions in general B23B 2200/323, multiple chip breaking grooves B23B 2200/325)
B23B 2200/088 . . . for clamping

B23B 2200/12 . Side or flank surfaces
B23B 2200/121 . . with projections
B23B 2200/123 . . curved

B23B 2200/125 . . discontinuous
B23B 2200/126 . . . stepped
B23B 2200/128 . . with one or more grooves

B23B 2200/16 . Supporting or bottom surfaces
B23B 2200/161 . . with projections
B23B 2200/162 . . curved
B23B 2200/163 . . discontinuous
B23B 2200/164 . . ground
B23B 2200/165 . . with one or more grooves
B23B 2200/166 . . polygonal
B23B 2200/167 . . with serrations
B23B 2200/168 . . star form

B23B 2200/20 . Top or side views of the cutting edge
B23B 2200/201 . . Details of the nose radius and immediately surrounding area
B23B 2200/202 . . with curved cutting edge
B23B 2200/204 . . with discontinuous cutting edge
B23B 2200/205 . . with cutting edge having a wave form
B23B 2200/207 . . for cutting a particular form corresponding to the form of the cutting edge
B23B 2200/208 . . with wiper, i.e. an auxiliary cutting edge to improve surface finish

B23B 2200/24 . Cross section of the cutting edge
B23B 2200/242 . . bevelled or chamfered
B23B 2200/245 . . rounded
B23B 2200/247 . . sharp

B23B 2200/28 . Angles
B23B 2200/283 . . Negative cutting angles
B23B 2200/286 . . Positive cutting angles

B23B 2200/32 . Chip breaking or chip evacuation
B23B 2200/321 . . by chip breaking projections (with projections on rake surface B23B 2200/081)
B23B 2200/323 . . by chip breaking depressions (with one or more grooves on top surface for chip breaking B23B 2200/087, with multiple chip breaking grooves B23B 2200/325)
B23B 2200/325 . . by multiple chip-breaking grooves (with one or more grooves on top surface for chip breaking B23B 2200/087, with chip breaking depression B23B 2200/323)
B23B 2200/326 . . by chip breaking-plates
B23B 2200/328 . . Details of chip evacuation

B23B 2200/36 . Other features of cutting inserts not covered by B23B 2200/04 to B23B 2200/32
B23B 2200/3609 . . Chamfers
B23B 2200/3618 . . Fixation holes
B23B 2200/3627 . . Indexing (with grooves on bottom surfaces B23C 2200/165, with polygonal bottom surfaces L23C 200/16F, with star form bottom surfaces B23C 2200/167)

B23B 2200/3636 . . . with cutting geometries differing according to the indexed position
B23B 2200/3645 . . Lands, i.e. the outer peripheral section of the rake face
B23B 2200/3654 . . . being variable (negative lands of variable width B23B 2200/3672)
B23B 2200/3663 . . . having negative cutting angles (with bevelled cutting edge B23C 2200/243)
B23B 2200/3672 . . . . being variable (lands with variable width B23B 2200/3654)
B23B 2200/3681 . . Split inserts, i.e. comprising two or more sections roughly equal in size and having similar or dissimilar cutting geometries
B23B 2200/369 . . Mounted tangentially, i.e. where the rake face is not the face with the largest area

B23B 2205/00 Fixation of cutting inserts in holders

B23B 2205/02 . Fixation using an elastically deformable clamping member

B23B 2205/04 . Fixation screws, bolts or pins of particular form
B23B 2205/045 . . orientated obliquely to the hole in the insert or to the seating surface

B23B 2205/08 . using an eccentric

B23B 2205/10 . using two or more fixation screws

B23B 2205/12 . Seats for cutting inserts
B23B 2205/125 . . One or more walls of the seat being elastically deformable

B23B 2205/16 . Shims

B23B 2205/18 . Systems for indexing the cutting insert automatically

B23B 2205/21 . Systems for changing the cutting insert automatically
B23B 2205/215 . . using a magazine

B23B 2210/00 Details of turning tools

B23B 2210/02 . Tool holders having multiple cutting inserts
B23B 2210/022 . . Grooving tools
B23B 2210/025 . . . Grooving inserts arranged on a turret
B23B 2210/027 . . . Means for adjusting the grooving inserts

B23B 2210/04 . Self-sharpening tools

B23B 2210/06 . Chip breakers

B23B 2210/08 . Tools comprising intermediary toolholders

B23B 2210/12 . Tools comprising weakened spot on the tool at a preferred breakage location (break points on shanks of tools B23B 2231/0212)

B23B 2215/00 Details of workpieces

B23B 2215/04 . Aircraft components

B23B 2215/08 . Automobile wheels

B23B 2215/10 . Ammunition cartridge cases

B23B 2215/12 . Bearing races

B23B 2215/16 . Camshafts

B23B 2215/20 . Crankshafts

B23B 2215/24 . Components of internal combustion engines (B23B 2215/16 and B23B 2215/20 take precedence)

B23B 2215/242 . . Cylinder liners

B23B 2215/245 . . Pistons

B23B 2215/247 . . Piston rings

B23B 2215/28 . Firearms, guns

B23B 2215/32 . Railway tracks

B23B 2215/36 . Railway wheels

B23B 2215/40 . Spectacles

B23B 2215/56 . Springs

B23B 2215/60 . Steel wool

B23B 2215/64 . Thin walled components

B23B 2215/68 . Threaded components

B23B 2215/72 . Tubes, pipes

B23B 2215/76 . Components for turbines

B23B 2215/81 . . Turbine blades

B23B 2220/00 Details of turning, boring or drilling processes

B23B 2220/04 . Chamferring (B23B 2220/28 takes precedence)

B23B 2220/08 . Deburring

B23B 2220/12 . Grooving

B23B 2220/123 . . Producing internal grooves

B23B 2220/126 . . Producing ring grooves

B23B 2220/24 . Finishing (roughing and finishing B23B 2220/445)

B23B 2220/28 . Parting off and chamferring simultaneously

B23B 2220/32 . Drilling holes from both sides

B23B 2220/36 . Turning, boring or drilling at high speeds

B23B 2220/40 . Peeling

B23B 2220/44 . Roughing

B23B 2220/445 . . and finishing

B23B 2220/52 . Whirling

B23B 2222/00 Materials of tools or workpieces composed of metals, alloys or metal matrices

B23B 2222/04 . Aluminium

B23B 2222/12 . Brass

B23B 2222/14 . Cast iron (iron B23B 2222/44)

B23B 2222/16 . Cermet

B23B 2222/21 . Copper

B23B 2222/24 . Gold

B23B 2222/28 . Details of hard metal, i.e. cemented carbide

B23B 2222/32 . Details of high speed steel (stainless steel B23B 2222/80, steel B23B 2222/84)

B23B 2222/36 . Nickel chrome alloys, e.g. Inconel®

B23B 2222/41 . Nickel steel alloys, e.g. invar®

B23B 2222/44 . Iron (cast iron B23B 2222/14)

B23B 2222/48 . Lead

B23B 2222/52 . Magnesium

B23B 2222/56 . Non-specified metals

B23B 2222/61 . Metal matrices with non-metallic particles or fibres

B23B 2222/64 . Nickel

B23B 2222/68 . Palladium

B23B 2222/72 . Platinum

B23B 2222/76 . Silver

B23B 2222/80 . Stainless steel (high speed steel B23B 2222/32, steel B23B 2222/84)

B23B 2222/84 . Steel (high speed steel B23B 2222/32, stainless steel B23B 2222/80)

B23B 2222/88 . Titanium

B23B 2222/92 . Tungsten

B23B 2222/98 . Zinc

B23B 2224/00 Materials of tools or workpieces composed of a compound including a metal

B23B 2224/04 . Aluminium oxide

B23B 2224/08 . Aluminium nitride

B23B 2224/12 . Chromium carbide

B23B 2224/16 . Molybdenum disulphide

B23B 2224/20 . Tantalum carbide

B23B 2224/24 . Titanium aluminium nitride

B23B 2224/28 . Titanium carbide

B23B 2224/32 . Titanium carbide nitride (TiCN)

B23B 2224/36 . Titanium nitride

B23B 2224/40 . Tungsten disulphide

B23B 2226/00 Materials of tools or workpieces not comprising a metal

B23B 2226/04 . Aromatic polyamides

B23B 2226/09 . Asbestos

B23B 2226/12 . Boron nitride

B23B 2226/125 . . cubic (CBN)

B23B 2226/15 . Cardboard

B23B 2226/18 . Ceramic

B23B 2226/27 . Composites

B23B 2226/275 . . Carbon fibre reinforced carbon composites

B23B 2226/31 . Diamond
B23B 2226/315 . . polycrystalline (PCD)

B23B 2226/33 . Elastomers, e.g. rubber

B23B 2226/36 . Epoxy

B23B 2226/39 . Foam

B23B 2226/42 . Gem, i.e. precious stone

B23B 2226/45 . Glass (turning glass B28D 1/16, drilling glass B28D 1/14)

B23B 2226/48 . Ice

B23B 2226/54 . Paper

B23B 2226/57 . Plasterboard, i.e. sheetrock

B23B 2226/61 . Plastics not otherwise provided for, e.g. nylon

B23B 2226/63 . Polyurethane

B23B 2226/66 . Polytetrafluoroethylene

B23B 2226/69 . Sapphire

B23B 2226/72 . Silicon carbide

B23B 2226/75 . Stone, rock or concrete (working of stone B28D)

B23B 2226/78 . Textile

B23B 2228/00 Properties of materials of tools or workpieces, materials of tools or workpieces applied in a specific manner

B23B 2228/04 . applied by chemical vapour deposition (CVD)

B23B 2228/08 . applied by physical vapour deposition (PVD)

B23B 2228/10 . Coatings
B23B 2228/105 . . with specified thickness

B23B 2228/12 . Abrasive

B23B 2228/16 . Shape memory alloys

B23B 2228/21 . Cast, i.e. In the form of a casting

B23B 2228/24 . Hard, i.e. after being hardened

B23B 2228/28 . Soft

B23B 2228/32 . Explosive

B23B 2228/36 . Multi-layered

B23B 2228/41 . Highly conductive

B23B 2228/44 . Materials having grain size less than 1 micrometre, e.g. nano-crystalline

B23B 2228/48 . Self-luminous, i.e. light-emitting, e.g. fluorescent

B23B 2228/52 . Solid lubricants

B23B 2228/56 . Two phase materials

B23B 2228/61 . Materials comprising whiskers

B23B 2229/00 Details of boring bars or boring heads

B23B 2229/04 . Guiding pads

B23B 2229/08 . Cutting edges of different lengths or at different axial positions

B23B 2229/12 . Cutting inserts located on different radii

B23B 2229/16 . Boring, facing or grooving heads with integral electric motor

B23B 2231/00 Details of chucks, toolholder shanks or tool shanks

B23B 2231/02 . Features of shanks of tools not relating to the operation performed by the tool

B23B 2231/0204 . . Connection of shanks to working elements of tools

B23B 2231/0208 . . Bores

B23B 2231/0212 . . Shanks of tools having a reduced cross section at a position where breakage of the tool is preferred (break points on tools not in shank area B23B 2210/12, shanks with reduced cross sections in general B23B 2231/0252)

B23B 2231/0216 . . Overall cross sectional shape of the shank (not used)

B23B 2231/022 . . . Triangular

B23B 2231/0224 . . . . Rounded triangular

B23B 2231/0228 . . . Square

B23B 2231/0232 . . . Hexagonal

B23B 2231/0236 . . . Octagonal

B23B 2231/024 . . . Star form

B23B 2231/0244 . . . Special forms not otherwise provided for

B23B 2231/0248 . . Codes for diameters

B23B 2231/0252 . . Shanks having a section of reduced diameter (to provide a preferred breaking point B23B 2231/0212)

B23B 2231/0256 .. Flats
B23B 2231/026 .. Grooves (keyways B23B 2231/0276)
B23B 2231/0264 ... Axial grooves
B23B 2231/0268 ... Radial grooves
B23B 2231/0272 ... Grooves on conical clamping surfaces
B23B 2231/0276 .. Keyways (axial grooves B23B 2231/0264)
B23B 2231/028 .. Lugs
B23B 2231/0284 .. Notches
B23B 2231/0288 .. Conical shanks of tools in which the cone is not formed as one continuous surface
B23B 2231/0292 .. Flanges of conical shanks
B23B 2231/0296 .. Ends of conical shanks, e.g. pull studs, tangs

B23B 2231/04 . Adapters

B23B 2231/06 . Chucks for handtools having means for opening and closing the jaws using the driving motor of the handtool

B23B 2231/08 . Chucks for shanks of tools having means for reducing the bending of the retained shanks

B23B 2231/10 . Chucks having data storage chips

B23B 2231/12 . Chucks having means to amplify the force produced by the actuating means to increase the clamping force

B23B 2231/14 . Chucks with clamping force limitation means

B23B 2231/20 . Collet chucks
B23B 2231/2002 .. Collets having blade-like jaws
B23B 2231/2005 .. Keys preventing rotation
B23B 2231/2008 .. Bores holding the collet having a slightly conical profile
B23B 2231/201 .. Operating surfaces of collets, i.e. the surface of the collet acted on by the operating means
B23B 2231/2013 ... Non-cylindrical (polygonal L231/20H3)
B23B 2231/2016 ... Polygonal
B23B 2231/2018 ... with a saw-tooth profile
B23B 2231/2021 ... comprising two different cones
B23B 2231/2024 .. Non-circular surfaces of collets for the transmission of torque
B23B 2231/2027 .. Gripping surfaces, i.e. the surface contacting the tool or workpiece
B23B 2231/2029 ... Conical
B23B 2231/2032 ... with non-cylindrical cross section
B23B 2231/2035 ... Polygonal
B23B 2231/2037 ... Roughened
B23B 2231/204 ... with saw tooth profiles
B23B 2231/2043 ... Discontinuous, interrupted or split
B23B 2231/2045 ... comprising two or more diameters, e.g. stepped

B23B 2231/2048 .. Collets comprising inserts
B23B 2231/2051 ... brazed in position
B23B 2231/2054 ... glued in position
B23B 2231/2056 ... where the insert forms part of the surface gripping the workpiece or tool
B23B 2231/2059 ... Hard inserts
B23B 2231/2062 ... Inserts mechanically clamped in the collet
B23B 2231/2064 ... Inserts in the form of a roll
B23B 2231/2067 ... Soft inserts
B23B 2231/207 ... Inserts welded in position
B23B 2231/2072 .. Jaws of collets
B23B 2231/2075 ... of special form
B23B 2231/2078 .. Jaw carriers, i.e. components retaining the collet itself
B23B 2231/2081 .. Keys, spanners or wrenches to operate the collet chuck
B23B 2231/2083 .. Collets comprising screw threads
B23B 2231/2086 .. Collets in which the jaws are formed as separate elements, i.e. not joined together
B23B 2231/2089 .. Slits of collets
B23B 2231/2091 ... extending from both axial ends of the collet
B23B 2231/2094 ... Helical
B23B 2231/2097 ... having a special form not otherwise provided for

B23B 2231/22 . Compensating chucks, i.e. with means for the compensation of irregularities of form or position

B23B 2231/24 . Cooling or lubrication means

B23B 2231/26 . Detection of clamping (in general B23Q 17/006)

B23B 2231/28 . Dust covers (nose pieces in chucks B23B 2231/44, dust covers for turning, boring or drilling in general L23B 260/58)

B23B 2231/30 . Chucks with four jaws

B23B 2231/32 . Guideways for jaws

B23B 2231/34 . Jaws
B23B 2231/345 .. Different jaws

B23B 2231/36 . Sealed joints
B23B 2231/365 .. using O-rings

B23B 2231/38 . Keyless chucks for hand tools

B23B 2231/40 . Chucks having a pivotal retention element in the form of a laterally acting cam

B23B 2231/42 . Chucks operated by a motor which is movable to engage with, or disengage from, the chuck operating means

B23B 2231/44 . Nose pieces (dust covers in chucks B23B 2231/28, dust covers for turning, boring or

drilling in general L23B 260/58)

B23B 2231/46 . Pins

B23B 2231/48 . Polygonal cross sections

B23B 2231/50 . Devices to counteract clamping forces exerted within the spindle in order to release the tool or workpiece

B23B 2231/52 . Chucks with means to loosely retain the tool or workpiece in the unclamped position

B23B 2231/54 . Chucks for taps

B23B 2233/00 Details of centres or drivers

B23B 2233/04 . Means to allow the facing of the axial end of the workpiece near the axis of rotation

B23B 2233/08 . Centres or drivers comprising a ball

B23B 2233/12 . Centres or drivers with a special arrangement of bearings or with special bearings

B23B 2233/16 . Centres or drivers comrprising chucks

B23B 2233/20 . Centres or drivers with convex surfaces

B23B 2233/24 . Centres or drivers with inserts

B23B 2233/28 . Centres or drivers supporting the workpiece at three points around the circumference

B23B 2233/32 . Yieldable centres

B23B 2235/00 Turning of brake discs, drums or hubs

B23B 2235/04 . Machining of brake discs

B23B 2235/045 . . Simultaneous machining of both sides of the brake disc

B23B 2235/12 . Machining of brake drums

B23B 2235/16 . Machining of hubs

B23B 2235/21 . Compensation of run out

B23B 2240/00 Details of connections of tools or workpieces

B23B 2240/04 . Bayonet connections

B23B 2240/08 . Brazed connections

B23B 2240/11 . Soldered connections

B23B 2240/16 . Welded connections

B23B 2240/21 . Glued connections

B23B 2240/24 . Connections using hollow screws, e.g. for the transmission of coolant

B23B 2240/28 . Shrink-fitted connections, i.e. using heating and cooling to produce interference fits (shrink fits chucks B23B 31/1179)

B23B 2240/32 . Press fits

B23B 2240/36 . Connections using a tongue and a hollow of corresponding prismatic form

B23B 2247/00 Details of drilling jigs

B23B 2247/02 . Jigs for drilling spectacles (machines for drilling spectacle lenses B28D 1/143)

B23B 2247/04 . Jigs using one or more holes as datums for drilling further holes

B23B 2247/06 . Jigs for drilling holes for lock sets for doors

B23B 2247/08 . Jigs for drilling overlapping or interfering holes

B23B 2247/10 . Jigs for drilling inclined holes

B23B 2247/12 . Drilling jigs with means to affix the jig to the workpiece

B23B 2247/14 . Jigs for drilling flanges

B23B 2247/16 . Jigs for drilling stairs and associated components, e.g. banisters or handrails

B23B 2247/18 . Jigs comprising V-blocks

B23B 2247/20 . Jigs for drilling holes for lock wires in bolts or nuts

B23B 2250/00 Compensating adverse effects during turning, boring or drilling

B23B 2250/04 . Balancing rotating components (vibration damping B23B 2250/16)

B23B 2250/08 . Compensation of centrifugal force (use of centrifugal force B23B 2270/04)

B23B 2250/12 . Cooling and lubrication

B23B 2250/125 . . Improving heat transfer away from the working area of the tool by conduction

B23B 2250/16 . Damping of vibrations (balancing rotating components B23B 2250/04)

B23B 2251/00 Details of tools for drilling machines

B23B 2251/02 . Connections between shanks and removable cutting heads

B23B 2251/04 . Angles, e.g. cutting angles
B23B 2251/043 . . Helix angles
B23B 2251/046 . . . Variable

B23B 2251/08 . Side or plan views of cutting edges
B23B 2251/082 . . Curved cutting edges
B23B 2251/085 . . Discontinuous or interrupted cutting edges
B23B 2251/087 . . Cutting edges with a wave form

B23B 2251/12 . Cross sectional views of the cutting edges
B23B 2251/122 . . Bevelled cutting edges
B23B 2251/125 . . Rounded cutting edges
B23B 2251/127 . . Sharp cutting edges

B23B 2251/14 . Configuration of the cutting part, i.e. the main cutting edges

B23B 2251/18 . Configuration of the drill point

B23B 2251/20 . Number of cutting edges
B23B 2251/201 . . Single cutting edge
B23B 2251/202 . . Three cutting edges
B23B 2251/204 . . Four cutting edges
B23B 2251/205 . . Five cutting edges
B23B 2251/207 . . Six cutting edges
B23B 2251/208 . . Eight cutting edges

B23B 2251/24 . Overall form of drilling tools
B23B 2251/241 . . Cross sections of the diameter of the drill
B23B 2251/242 . . . increasing in a direction towards the shank from the tool tip
B23B 2251/244 . . . decreasing in a direction towards the shank from the tool tip
B23B 2251/245 . . . Variable cross sections
B23B 2251/247 . . Drilling tools having a working portion at both ends of the shank
B23B 2251/248 . . Drills in which the outer surface is of special form

B23B 2251/28 . Arrangement of teeth
B23B 2251/282 . . Unequal spacing of cutting edges in the circumferential direction
B23B 2251/285 . . Cutting teeth arranged at different heights
B23B 2251/287 . . Cutting edges having different lengths

B23B 2251/40 . Flutes, i.e. chip conveying grooves
B23B 2251/402 . . with increasing depth in a direction towards the shank from the tool tip
B23B 2251/404 . . with decreasing depth in a direction towards the shank from the tool tip
B23B 2251/406 . . of special form not otherwise provided for
B23B 2251/408 . . Spiral grooves

B23B 2251/42 . Types of drill
B23B 2251/422 . . Deep hole drills, e.g. ejector drills
B23B 2251/424 . . . Gun drills
B23B 2251/426 . . Micro-drills
B23B 2251/428 . . Drills for cutting plugs of material

B23B 2251/44 . Margins, i.e. the area of the circumference following the axial cutting edge in the direction of rotation
B23B 2251/443 . . Double margin drills
B23B 2251/446 . . Drills with variable margins

B23B 2251/46 . Drills having a centre free from cutting edges or with recessed cutting edges

B23B 2251/48 . Chip breakers

B23B 2251/50 . Drilling tools comprising cutting inserts
B23B 2251/505 . . set at different heights

B23B 2251/52 . Depth indicators

B23B 2251/54 . Drilling tools having provision for drilling different diameters

B23B 2251/56 . Guiding pads

B23B 2251/58 . Guiding rolls

B23B 2251/60 . Drills with pilots
B23B 2251/603 . . Detachable pilots, e.g. in the form of a drill
B23B 2251/606 . . . being a twist drill

B23B 2251/62 . Drilling tools having means to reinforce the shank, e.g. drills having small shanks being gripped by devices having a larger shank

B23B 2251/64 . Drills operating in the reverse direction, i.e. in the unscrewing direction of a right-hand thread

B23B 2251/66 . Drills with provision to be used as a screwdriver

B23B 2251/68 . Drills with provision for suction (use of suction in turning, boring or drilling in general B23B 2270/62)

B23B 2251/70 . Drills with vibration suppressing means

B23B 2260/00 Details of constructional elements

B23B 2260/002 . Accumulators

B23B 2260/004 . Adjustable elements
B23B 2260/0045 . . Two elements adjustable relative to each other in three mutually perpendicular

directions

B23B 2260/008 . Bearings
B23B 2260/0082 . . Sliding contact bearings
B23B 2260/0085 . . Needle roller bearings
B23B 2260/0087 . . Preloading of bearings

B23B 2260/016 . Bolts

B23B 2260/018 . Brushes

B23B 2260/02 . Cams

B23B 2260/022 . Balls

B23B 2260/024 . Batteries

B23B 2260/026 . Bushings, e.g. adapter sleeves

B23B 2260/028 . Chains

B23B 2260/03 . Clamps

B23B 2260/032 . Diaphragms

B23B 2260/034 . Drawbars

B23B 2260/036 . Cables

B23B 2260/038 . Cartridges

B23B 2260/04 . Centre drills of known configuration, e.g. the provision of a centre drill in centres or chucks

B23B 2260/042 . Collets of known configuration, i.e. devices using a collet

B23B 2260/044 . Clutches
B23B 2260/0445 . . Overload clutches

B23B 2260/048 . Devices to regulate the depth of cut
B23B 2260/0482 . . Depth controls, e.g. depth stops (stops B23B 2260/12)
B23B 2260/0485 . . Depth gauges
B23B 2260/0487 . . Depth indicators (indication scales L23B 260/88)

B23B 2260/056 . Differential screw threads

B23B 2260/058 . Dust covers (dust covers in chucks B23B 2231/28, nose pieces in chucks L231/44)

B23B 2260/062 . Electric motors
B23B 2260/0625 . . Linear motors

B23B 2260/066 . Electrostrictive elements

B23B 2260/068 . Flexible members

B23B 2260/07 . Gears

B23B 2260/072 . Grooves

B23B 2260/0725 . . Spiral

B23B 2260/076 . Harmonic drive gearboxes, i.e. reduction gearing including wave generator, flex spline and a circular spline

B23B 2260/078 . Hand tools used to operate chucks or to assemble, adjust or disassemble tools or equipment used for turning, boring or drilling

B23B 2260/0785 . . for unclamping cutting inserts

B23B 2260/082 . Holes

B23B 2260/084 . Hirth couplings

B23B 2260/088 . Indication scales

B23B 2260/09 . Knurled surfaces

B23B 2260/092 . Lasers

B23B 2260/094 . Levels, e.g. spirit levels

B23B 2260/096 . Levers

B23B 2260/098 . Magazines

B23B 2260/10 . Magnets

B23B 2260/102 . Magnetostrictive elements

B23B 2260/104 . Markings, i.e. symbols or other indicating marks

B23B 2260/106 . Nuts

B23B 2260/108 . Piezoelectric elements

B23B 2260/11 . Planetary drives

B23B 2260/112 . Projections

B23B 2260/114 . Rings

B23B 2260/116 . Rollers or rolls

B23B 2260/118 . Suction pads or vacuum cups, e.g. for attachment of guides to workpieces

B23B 2260/12 . Stops (depth controls L23B 260/48C)

B23B 2260/122 . Safety devices

B23B 2260/124 . Screws

B23B 2260/126 . Seals

B23B 2260/128 . Sensors
B23B 2260/1285 . . Vibration sensors

B23B 2260/132 . Serrations (cutting inserts with serrated bottom surfaces B23B 2200/167)

B23B 2260/134 . Spacers or shims (shims for supporting cutting inserts B23B 2205/16)

B23B 2260/136 . Springs

B23B 2260/138 . Screw threads
B23B 2260/1381 . . Conical
B23B 2260/1383 . . with round thread profile
B23B 2260/1385 . . with square thread profile
B23B 2260/1386 . . with trapezoidal thread profile
B23B 2260/1388 . . with special profile not otherwise provided for

B23B 2260/142 . Valves

B23B 2260/144 . Wear indicators

B23B 2260/146 . Wedges

B23B 2260/158 . Worms and worm wheels

B23B 2265/00 Details of general geometric configurations

B23B 2265/08 . Conical

B23B 2265/12 . Eccentric

B23B 2265/16 . Elliptical

B23B 2265/32 . Polygonal
B23B 2265/322 . . Square
B23B 2265/324 . . Pentagonal
B23B 2265/326 . . Hexagonal
B23B 2265/328 . . Octagonal

B23B 2265/34 . Round

B23B 2265/36 . Spherical

B23B 2270/00 **Details of turning, boring or drilling machines, processes or tools not otherwise provided for**

B23B 2270/02 . Use of a particular power source
B23B 2270/022 . . Electricity
B23B 2270/025 . . Hydraulics
B23B 2270/027 . . Pneumatics

B23B 2270/04 . Use of centrifugal force (compensating centrifugal force B23B 2250/08)

B23B 2270/06 . Use of elastic deformation

B23B 2270/08 . Clamping mechanisms; Provisions for clamping (B23B 2210/00 takes precedence)

B23B 2270/09 . Details relating to unclamping

B23B 2270/10 . Use of ultrasound

B23B 2270/12 . Centering of two components relative to one another

B23B 2270/14 . Constructions comprising exactly two similar components

B23B 2270/16 . Constructions comprising three or more similar components

B23B 2270/20 . Internally located features, machining or gripping of internal surfaces
B23B 2270/205 . . Machining or gripping both internal and external surfaces

B23B 2270/22 . Externally located features, machining or gripping of external surfaces (machining or gripping of both internal and external surfaces B23B 2270/205)

B23B 2270/24 . Tool, chuck or other device activated by the coolant or lubrication system of the machine tool

B23B 2270/26 . Burnishing

B23B 2270/28 . Cleaning

B23B 2270/30 . Chip guiding or removal (use of suction B23B 2270/62, drilling tools with provision for suction B23B 2251/68)

B23B 2270/32 . Use of electronics

B23B 2270/34 . Means for guiding

B23B 2270/36 . Identification of tooling or other equipment

B23B 2270/38 . Using magnetic fields (magnets B23B 2260/10)

B23B 2270/48 . Measuring or detecting
B23B 2270/483 . . Measurement of force

B23B 2270/486 . . Measurement of rotational speed

B23B 2270/54 . Methods of turning, boring or drilling not otherwise provided for

B23B 2270/56 . Turning, boring or drilling tools or machines with provision for milling

B23B 2270/58 . Oblique elements

B23B 2270/60 . Prevention of rotation

B23B 2270/62 . Use of suction (suction pads or vacuum cups B23B 2260/118, drilling tools with provision for suction B23B 2251/68, chip removal B23B 2270/30)