

CPC COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

SHAPING

B23 MACHINE TOOLS; METAL-WORKING NOT OTHERWISE PROVIDED FOR

(NOTES omitted)

B23D PLANING; SLOTTING; SHEARING; BROACHING; SAWING; FILING; SCRAPING; LIKE OPERATIONS FOR WORKING METAL BY REMOVING MATERIAL, NOT OTHERWISE PROVIDED FOR (making toothed gears or the like [B23F](#); cutting metal by applying heat locally [B23K](#); arrangements for copying or controlling [B23Q](#))

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.

Planing; Slotting

1/00 Planing or slotting machines cutting by relative movement of the tool and workpiece in a horizontal straight line only

- 1/003 . {for planing elongated workpieces}
- 1/006 . . {Rails}
- 1/02 . by movement of the work-support
- 1/04 . . with the tool supported only on one side of the bed
- 1/06 . . with the tool supported on both sides of the bed
- 1/08 . by movement of the tool
- 1/10 . . with means for adjusting the tool-guide vertically
- 1/12 . . . with the tool supported only on one side of the bed
- 1/14 . . . with the tool supported on both sides of the bed
- 1/16 . . without means for adjusting the tool-guide vertically
- 1/18 . cutting on both the forward and the return stroke
- 1/20 . with tool-supports or work-supports specially mounted or guided for working in different directions or at different angles; Special purpose machines
- 1/205 . . {Planing nuts, bolt heads or other prismatic workpieces}
- 1/22 . . for planing ingots or the like (scrubbing or peeling ingots by milling [B23C 3/14](#))
- 1/24 . . for planing inner surfaces, e.g. of moulds
- 1/26 . . for planing edges or ridges or cutting grooves (cutting helical grooves [B23D 5/02](#))
- 1/28 . . in which the tool or workpiece is fed otherwise than in a straight line, e.g. for planing profiled stock
- 1/30 . . . in which the direction of feed is controlled by a copying device, e.g. by a pattern (features of copying devices [B23Q 35/00](#))

3/00 Planing or slotting machines cutting by relative movement of the tool and workpiece in a vertical or inclined straight line

- 3/02 . for cutting grooves (cutting helical grooves [B23D 5/02](#))
- 3/04 . in which the tool or workpiece is fed otherwise than in a straight line
- 3/06 . . in which the direction of feed is controlled by a copying device, e.g. by a pattern (features of copying devices [B23Q 35/00](#))
- 5/00 Planing or slotting machines cutting otherwise than by relative movement of the tool and workpiece in a straight line
- 5/02 . involving rotary and straight-line movements only, e.g. for cutting helical grooves
- 5/04 . controlled by a copying device, e.g. by a pattern (features of copying devices [B23Q 35/00](#))
- 7/00 Planing or slotting machines characterised only by constructional features of particular parts (constructional features of these parts per se [B23Q](#))
- 7/02 . of frames; of work-table beds
- 7/04 . of pillars, of cross-beams
- 7/06 . of tool-carrying arrangements
- 7/08 . of work-tables
- 7/10 . of drives for reciprocating parts
- 7/105 . . {hydraulically driven}
- 7/12 . of arrangements for impact damping or regenerating energy
- 9/00 Hand-operated planing devices; Portable planing apparatus
- 11/00 Planing or slotting devices able to be attached to a machine tool, whether or not replacing an operative portion of the machine tool
- 13/00 Tools or tool holders specially designed for planing or slotting machines (features applicable also to turning-machines [B23B 27/00](#), [B23B 29/00](#); for cutting gear teeth [B23F 21/04](#))
- 13/005 . {Tools or tool holders adapted to operate in both the forward and return stroke}
- 13/02 . Pivotaly-mounted holders
- 13/04 . Holders for tool sets

- 13/06 . Devices for lifting or lowering the tool

Shearing; Similar cutting

- 15/00 Shearing machines or shearing devices cutting by blades which move parallel to themselves**
- 15/002 . {for cutting in more than one direction, e.g. angle cutting}
- 15/005 . {for bias cutting of webs or sheets}
- 2015/007 . {reciprocating horizontally}
- 15/02 . having both upper and lower moving blades
- 15/04 . having only one moving blade
- 15/06 . Sheet shears {([B23D 15/002](#) and [B23D 15/005](#) take precedence)}
- 15/08 . . with a blade moved in one plane, e.g. perpendicular to the surface of the sheet
- 15/10 . . with a blade moved in a curved surface, e.g. for producing an edge with a curved cross-section
- 15/12 . characterised by drives or gearings therefor
- 15/14 . . actuated by fluid or gas pressure
- 15/145 . . . {actuated by explosion}
- 17/00 Shearing machines or shearing devices cutting by blades pivoted on a single axis (on an axis parallel to the blade [B23D 15/10](#); hand-held devices [B23D 29/00](#))**
- 17/02 . characterised by drives or gearings therefor
- 17/04 . . actuated by a rotary shaft
- 17/06 . . actuated by fluid or gas pressure
- 17/08 . . actuated by hand or foot operated lever mechanism
- 19/00 Shearing machines or shearing devices cutting by rotary discs (by friction saw-discs [B23D 45/00](#))**
- 19/02 . having both a fixed shearing blade and a rotary shearing disc
- 19/04 . having rotary shearing discs arranged in co-operating pairs
- 19/06 . . with several spaced pairs of shearing discs working simultaneously, e.g. for trimming or making strips
- 19/065 . . . {for cutting along lines not parallel to the longitudinal direction of the material, e.g. oblique or zig-zag cutting}
- 19/08 . for special use, e.g. for cutting curves, for chamfering edges
- 21/00 Machines or devices for shearing or cutting tubes (by sawing, see the relevant groups for sawing machines or sawing devices; as additional equipment for deep drawing presses [B21D 24/16](#))**
- 21/003 . {by tools working in different directions successively}
- 21/006 . {and sealing, crushing or chamfering the tubes}
- 21/02 . otherwise than in a plane perpendicular to the axis of the tube, e.g. for making mitred cuts, for making bicycle frames
- 21/04 . Tube-severing machines with rotating tool-carrier
- 21/06 . Hand-operated tube-cutters
- 21/08 . . with cutting wheels
- 21/10 . . with other cutting blades or tools
- 21/12 . . . with provision for hammering on the tool
- 21/14 . cutting inside the tube
- 21/145 . . {hand operated}

23/00 Machines or devices for shearing or cutting profiled stock (hand-held devices [B23D 29/00](#))

- 2023/005 . {for window coverings}
- 23/02 . otherwise than in a plane perpendicular to the axis of the stock
- 23/04 . by means of holding-dies, arranged side by side, subjecting the stock to torsional stress
- 25/00 Machines or arrangements for shearing stock while the latter is travelling otherwise than in the direction of the cut (controlling slack in travelling flexible stock [B21C 47/10](#))**
- 25/02 . Flying shearing machines ([B23D 25/12](#) takes precedence)
- 25/04 . . in which a cutting unit moves bodily with the work while cutting ([B23D 25/06](#) takes precedence)
- 25/06 . . having a cutting device mounted on an oscillating lever
- 25/08 . . having two coacting shearing blades mounted independently
- 25/10 . . . on co-operating beams moving parallel to each other and attached to lever mechanisms
- 25/12 . Shearing machines with blades on coacting rotating drums
- 25/14 . without regard to the exact dimensions of the resulting material, e.g. for cutting-up scrap
- 27/00 Machines or devices for cutting by a nibbling action**
- 27/02 . Hand-held devices
- 27/04 . . actuated by electric power
- 27/06 . . actuated by fluid or gas pressure
- 29/00 Hand-held metal-shearing or metal-cutting devices (with nibbling action [B23D 27/02](#); hand-operated devices for metal-cutting otherwise than by shearing [B26B](#))**
- 29/002 . {for cutting wire or the like}
- 29/005 . {for cutting sheets}
- 29/007 . {for splitting nuts (hand operated tools with cutting action actuated by muscle power [B26B 17/003](#))}
- 29/02 . Hand-operated metal-shearing devices
- 29/023 . . {for cutting wires}
- 29/026 . . {for cutting sheets}
- 31/00 Shearing machines or shearing devices covered by none or more than one of the groups [B23D 15/00](#) - [B23D 29/00](#); Combinations of shearing machines**
- 31/001 . {for trimming deep drawn products (combined with deep-drawing presses [B21D 24/16](#))}
- 31/002 . {Breaking machines, i.e. pre-cutting and subsequent breaking}
- 31/003 . . {for rings}
- 2031/005 . . . {Cap holders therefor}
- 2031/006 . . . {for gangs}
- 2031/007 . . {for journals}
- 31/008 . {Cutting-up scrap (disintegrating by knives in general [B02C 18/00](#); cutting-up scrap while the material is travelling otherwise than in the direction of the cut [B23D 25/14](#))}
- 31/02 . for performing different cutting operations on travelling stock, e.g. slitting and severing simultaneously

- 31/04 . . for trimming stock combined with devices for shredding scrap
- 33/00 Accessories for shearing machines or shearing devices (feeding stock to machines or removing stock B21D 43/00)**
- 33/003 . . {for obtaining pieces of a predetermined weight or volume, e.g. control arrangements (B23D 36/0025 takes precedence)}
- 33/006 . . {for obtaining pieces of a predetermined length, e.g. control arrangements (B23D 36/0033 takes precedence)}
- 33/02 . . Arrangements for holding, guiding, and/or feeding work during the operation
- 33/025 . . {Guillotines with holding means behind the knives}
- 33/04 . . for making circular cuts
- 33/06 . . in which the direction of feed is controlled by a copying device, e.g. by a pattern (features of copying devices B23Q 35/00)
- 33/08 . . Press-pads; Counter-bases; Hold-down devices
- 33/10 . . Stops for positioning work
- 33/12 . . Equipment for indicating where to cut
- 35/00 Tools for shearing machines or shearing devices; Holders or chucks for shearing tools**
- 35/001 . . {cutting members}
- 35/002 . . {Means for mounting the cutting members}
- 35/004 . . {for circular cutting members}
- 35/005 . . {Adjusting the position of the cutting members}
- 35/007 . . {for circular cutting members}
- 35/008 . . {Means for changing the cutting members (mounting per se B23D 35/002)}
- 36/00 Control arrangements specially adapted for machines for shearing or similar cutting, or for sawing, stock which the latter is travelling otherwise than in the direction of the cut**
- 36/0008 . . {for machines with only one cutting, sawing, or shearing devices}
- 36/0016 . . {for minimising waste}
- 36/0025 . . {for obtaining pieces of a predetermined weight or volume}
- 36/0033 . . {for obtaining pieces of a predetermined length}
- 36/0041 . . . {the tool moving continuously}
- 36/005 . . . {and taking account of marks, e.g. on the stock}
- 36/0058 . . . {the tool stopping for a considerable time after each cutting operation}
- 36/0066 . . . {and taking account of marks, e.g. on the stock}
- 36/0075 . . . {and taking account of the temperature of the stock}
- 36/0083 . . {for cutting off of the ends of the products, e.g. cropping shears}
- 36/0091 . . {for machines with more than one cutting, shearing, or sawing devices}
- NOTE**
- Broaching
- 37/00 Broaching machines or broaching devices**
- 37/005 . . {for cylindrical workpieces, e.g. crankshafts (takes precedence over other subgroups)}
- 37/02 . . Broaching machines with horizontally-arranged working tools

- 37/04 . . for broaching inner surfaces
- 37/06 . . for broaching outer surfaces
- 37/08 . . Broaching machines with vertically-arranged working tools
- 37/10 . . for broaching inner surfaces
- 37/12 . . for broaching outer surfaces
- 37/14 . . Broaching machines with rotatably-arranged working tools
- 37/16 . . for broaching helical grooves
- 37/18 . . Broaching machines with working tools mounted on an endless chain or belt
- 37/20 . . Broaching machines with arrangements for working in opposite directions
- 37/22 . . for special purposes (B23D 37/14 takes precedence)
- 39/00 Accessories for broaching machines or broaching devices**
- 41/00 Broaching machines or broaching devices characterised only by constructional features of particular parts (constructional features of these parts per se B23Q)**
- 41/02 . . of frames; of work supports
- 41/04 . . of tool-carrying arrangements
- 41/06 . . of devices for feeding, clamping, or ejecting workpieces
- 41/08 . . of drives; of control devices
- 41/083 . . {Hydraulic drives}
- 41/086 . . {Control devices}
- 43/00 Broaching tools (for cutting gear teeth B23F 21/26)**
- 43/005 . . {for cutting helical grooves}
- 43/02 . . for cutting by rectilinear movement (B23D 43/08 takes precedence)
- 2043/025 . . {for producing grooves in turbines, e.g. for the insertion of blades}
- 43/04 . . having inserted cutting edges
- 43/06 . . for cutting by rotational movement
- 2043/063 . . {with cutters mounted externally}
- 2043/066 . . {with cutters mounted internally}
- 43/08 . . mounted on an endless chain or belt
- Sawing (surgical saws A61B 17/14; sawing wood or similar material B27B; {sawing stone B28D 1/02})**
- 45/00 Sawing machines or sawing devices with circular saw blades or with friction saw discs (shearing machines with rotary discs B23D 19/00 - B23D 25/00)**
- 45/003 . . {for particular purposes}
- 45/006 . . {with means to attach the sawing device to the workpiece}
- 45/02 . . with a circular saw blade or the stock mounted on a carriage
- 45/021 . . {with the saw blade mounted on a carriage (B23D 45/06, B23D 45/046 take precedence)}
- 45/022 . . . {the carriage performing a vertical movement only}
- 45/024 . . . {the saw blade being adjustable according to depth or angle of cut (B23D 45/022 takes precedence)}
- 45/025 {Radial sawing machines}
- 45/027 . . . {the saw carriage being mounted on a carriage, e.g. gantry-type sawing machines}

- 45/028 . . . {the saw carriage being mounted on a pivoted lever}
- 45/04 . . with a circular saw blade or the stock carried by a pivoted lever
- 45/042 . . {with the saw blade carried by a pivoted lever (B23D 45/028, B23D 45/065 take precedence)}
- 45/044 . . . {the saw blade being adjustable according to angle of cut (B23D 45/025 takes precedence)}
- 45/046 . . . {the pivoted lever being mounted on a carriage}
- 45/048 {the saw blade being adjustable according to angle of cut}
- 45/06 . . with a circular saw blade arranged underneath a stationary work-table
- 45/061 . . {the saw blade being mounted on a carriage}
- 45/062 . . . {the saw blade being adjustable according to depth or angle of cut}
- 45/063 . . . {the carriage performing a vertical movement only}
- 45/065 . . {with the saw blade carried by a pivoted lever}
- 45/066 . . . {the pivoted lever being mounted on a carriage}
- 45/067 . . . {the saw blade being adjustable according to depth or angle of cut}
- 45/068 . . {the saw blade being adjustable according to depth or angle of cut (B23D 45/061, B23D 45/065 take precedence)}
- 45/08 . . with a ring blade having inside saw teeth
- 45/10 . . with a plurality of circular saw blades { (B23D 45/143, B23D 45/165 take precedence) }
- 45/102 . . {some of which turn about perpendicular axes (B23D 45/143 takes precedence) }
- 45/105 . . {operating within the same plane}
- 45/107 . . {mounted on a turret}
- 45/12 . . with a circular saw blade for cutting tubes
- 45/122 . . {for cutting slots in tubes}
- 45/124 . . {the workpieces turning about their longitudinal axis during the cutting operations}
- 45/126 . . {with the tool turning around the workpieces}
- 45/128 . . {with the tool introduced into the tubes and cutting from the inside outwards}
- 45/14 . . for cutting otherwise than in a plane perpendicular to the axis of the stock, e.g. for making a mitred cut
- 45/143 . . {with a plurality of circular saw blades}
- 45/146 . . . {the saw blades being angularly fixed}
- 45/16 . . Hand-held sawing devices with circular saw blades
- 45/165 . . {with a plurality of saw blades or saw blades having plural cutting zones}
- 45/18 . . Machines with circular saw blades for sawing stock while the latter is travelling otherwise than in the direction of the cut (control of such machines B23D 36/00)
- 45/20 . . Flying sawing machines, the saw carrier of which is reciprocated in a guide and moves with the travelling stock during sawing
- 45/22 . . Flying sawing machines with lever-supported saw carrier which moves in a complete circular path
- 45/24 . . Flying sawing machines with lever-supported saw carrier which oscillates in an arc
- 45/26 . . with high-speed cutting discs, performing the cut by frictional heat melting the material (grinders for cutting-off B24B 27/06)

47/00

Sawing machines or sawing devices working with circular saw blades, characterised only by constructional features of particular parts (constructional features of these parts per se B23Q; details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00)

- 47/005 . . {Vibration-damping}
- 47/02 . . of frames; of guiding arrangements for work-table or saw-carrier
- 47/025 . . . {of tables}
- 47/04 . . of devices for feeding, positioning, clamping, or rotating work
- 47/042 . . {for conveying work to, or discharging work from, the machine}
- 47/045 . . {feeding work into engagement with the saw blade}
- 47/047 . . . {the work being mounted on rotating work support}
- 47/06 . . for stock of indefinite length
- 47/065 . . . {for laterally feeding long workpieces}
- 47/08 . . of devices for bringing the circular saw blade to the workpiece or removing same therefrom
- 47/10 . . actuated by fluid or gas pressure
- 47/12 . . of drives for circular saw blades
- 47/123 . . {acting on the disc of the saw blade}
- 47/126 . . {Angle drives}

49/00

Machines or devices for sawing with straight reciprocating saw blades, e.g. hacksaws

- 49/001 . . {transportable, e.g. fitted with wheels}
- 49/002 . . {with means to attach the sawing device to the work}
- 49/003 . . {having a plurality of saw blades or saw blades having plural cutting zones}
- 49/005 . . . {with opposed saw blades}
- 49/006 . . {with contiguous, oppositely reciprocating saw blades}
- 49/007 . . {Jig saws, i.e. machine saws with a vertically reciprocating narrow saw blade chucked at both ends for contour cutting}
- 49/008 . . . {hand-driven or foot-driven}
- 49/02 . . Hacksaw machines with straight saw blades secured to a rectilinearly-guided frame, e.g. with the frame fed stepwise in the plane of the guide
- 49/04 . . Hacksaw machines with straight saw blades secured to a pivotally-arranged frame
- 49/06 . . Hacksaw machines with straight saw blades for special use
- 49/08 . . Pad-saw machines, i.e. machines in which the blade is attached to a carrier at one end only
- 49/10 . . Hand-held or hand-operated sawing devices with straight saw blades
- 49/105 . . . {with means for guiding the sawing device}
- 49/11 . . for special purposes, e.g. offset-blade hand; {Hand saws having spaced blades; Hand saws for sawing grooves or square holes}
- 49/12 . . Hacksaws (B23D 49/11, B23D 49/16 take precedence; bows adjustable in length or height B23D 51/12)
- 49/125 . . . {with wire-type frames}
- 49/14 . . Pad saws { (B23D 49/105, B23D 49/11, B23D 49/16 take precedence) }

- 49/16 . . . actuated by electric or magnetic power or prime movers ([B23D 49/11 takes precedence](#))
- 49/162 . . . {Pad sawing devices}
- 49/165 {with means to move the saw blades in an orbital path}
- 49/167 {with means to adjust the guide plate or with means to adjust the plane in which the saw blade moves}
- 51/00** **Sawing machines or sawing devices working with straight blades, characterised only by constructional features of particular parts** (constructional features of these parts [per se B23Q](#); details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed [B25F 5/00](#)); **Carrying or attaching means for tools, covered by this subclass, which are connected to a carrier at both ends**
 - 51/005 . {Devices for moving the tool to the workpiece}
 - 51/01 . characterised by the handle
 - 51/02 . of beds; of guiding arrangements for work-tables or saw carriers; of frames
 - 51/025 . . {of arrangements for guiding the saw blade}
 - 51/03 . . with extensible or collapsible frames {; Frames with spare blade storage means}
 - 51/04 . of devices for feeding, positioning, clamping, or rotating work
 - 51/043 . . {for conveying work to, or discharging work from, the machine}
 - 51/046 . . {for feeding work into engagement with the saw blade, e.g. rotating work while sawing}
 - 51/06 . . for stock of indefinite length
 - 51/065 . . . {for laterally feeding long workpieces}
 - 51/08 . of devices for mounting straight saw blades or other tools
 - 51/10 . . for hand-held or hand-operated devices
 - 51/12 . . for use with tools, dealt with in this subclass, which are connected to a carrier at both ends, e.g. bows adjustable in length or height
 - 51/125 . . . {Blade tensioning means}
 - 51/14 . . . Attachment of the tool
 - 51/16 . of drives or feed mechanisms for straight tools, e.g. saw blades, or bows
 - 51/163 . . {Vibratory electromagnetic drives therefor}
 - 51/166 . . {Devices for arresting movement of the saw blades ([B23D 51/20 takes precedence](#))}
 - 51/18 . . actuated by fluid or gas pressure ([B23D 51/20 takes precedence](#))
 - 51/20 . . with controlled feed of the tool, or with special arrangements for relieving or lifting the tool on the return stroke
- 53/00** **Machines or devices for sawing with strap saw-blades which are effectively endless in use, e.g. for contour cutting**
 - 53/001 . {transportable, e.g. fitted with wheels}
 - 53/003 . {with means to attach the sawing device to the workpiece}
 - 53/005 . {with a plurality of band saw blades or band saw blades having plural cutting zones, e.g. contiguous oppositely-moving saw blade portions ([for length cutting of trunks B27B 15/08](#))}
 - 53/006 . {Convertible sawing devices}
 - 53/008 . {Open-end band saws}
- 53/02 . with stationarily-mounted wheels, {i.e. during sawing} carrying the strap ([B23D 53/06 takes precedence](#))
- 53/023 . . {Arrangements for tilting the head carrying the saw wheels}
- 53/026 . . {the band saw blade being guided in a horizontal plane}
- 53/04 . with the wheels carrying the strap mounted shiftably or swingingly {, i.e. during sawing}, other than merely for adjustment
- 53/045 . . {with pivotably mounted head carrying the saw wheels}
- 53/06 . with shiftable or swinging work-table
- 53/08 . for cutting profiled stock
- 53/10 . Sawing devices working with strap saw-blades able to be attached to a machine tool, whether or not replacing an operative portion of the machine tool
- 53/12 . Hand-held or hand-operated sawing devices working with strap saw blades
- 55/00** **Sawing machines or sawing devices working with strap saw blades, characterised only by constructional features of particular parts** (constructional features of these parts [per se B23Q](#))
 - 55/005 . {Devices for damping vibrations}
 - 55/02 . of frames; of tables
 - 55/023 . . {of tables ([B23D 53/06 takes precedence](#))}
 - 55/026 . . . {the table being adjustable according to depth or angle of cut}
 - 55/04 . of devices for feeding or clamping work
 - 55/043 . . {for conveying work to the sawing machine}
 - 55/046 . . {for feeding work into engagement with the saw blade ([B23D 53/06 takes precedence](#))}
 - 55/06 . of drives for strap saw blades; of wheel mountings
 - 55/065 . . {of wheels}
 - 55/08 . of devices for guiding or feeding strap saw blades
 - 55/082 . . {Devices for guiding strap saw blades}
 - 55/084 . . . {which automatically detect or correct band saw blade deflection}
 - 55/086 . . . {with means for automatically adjusting the distance between the guides}
 - 55/088 . . {Devices for feeding strap saw blades}
 - 55/10 . of devices for tensioning strap saw blades ([B23D 55/06 takes precedence](#); incorporated in the strap [B23D 61/12](#))
- 57/00** **Sawing machines or sawing devices not covered by one of the preceding groups** [B23D 45/00 - B23D 55/00](#)
 - 57/0007 . {using saw wires}
 - 57/0015 . . {hand-held or hand-operated}
 - 57/0023 . . {with a plurality of saw wires or saw wires having plural cutting zones}
 - 57/003 . {Sawing machines or sawing devices working with saw wires, characterised only by constructional features of particular parts ([constructional features of these parts per se B23Q](#))}
 - 57/0038 . . {of frames; of tables}
 - 57/0046 . . {of devices for feeding, conveying or clamping work}
 - 57/0053 . . {of drives for saw wires; of wheel mountings; of wheels}
 - 57/0061 . . {of devices for guiding or feeding saw wires}
 - 57/0069 . . {of devices for tensioning saw wires}

- 57/0076 . {Devices for converting any machine for sawing purposes}
- 57/0084 . {specially adapted for sawing under water or at places accessible with difficulty}
- 57/0092 . {dismountable, collapsible or transportable, e.g. by means of a carrying case}
- 57/02 . with chain saws
- 57/023 . . {hand-held or hand-operated}
- 57/026 . . {with a plurality of saw chains}
- 59/00 Accessories specially designed for sawing machines or sawing devices (lubricating or cooling machine tools in general [B23Q 11/12](#))**
- 59/001 . {Measuring or control devices, e.g. for automatic control of work feed pressure on band saw blade (measuring in general [G01](#); controlling in general [G05](#))}
- 59/002 . . {for the position of the saw blade ([B27B 5/36](#) and [B27B 9/02](#) take precedence)}
- 59/003 . . . {Indicating the cutting plane on the workpiece, e.g. by projecting a laser beam}
- 59/005 . . {for preventing collision of saw blades with other machine parts or workpieces}
- 59/006 . {for removing or collecting chips}
- 59/007 . {for mounting a portable sawing device on a frame part}
- 59/008 . {comprising computers}
- 59/02 . Devices for lubricating or cooling circular saw blades
- 59/025 . . {the lubricating or cooling medium being applied through the mounting means of the tool, e.g. the tool spindle or hub}
- 59/04 . Devices for lubricating or cooling straight or strap saw blades
- 61/00 Tools for sawing machines or sawing devices (tools for trepanning [B23B 51/04](#)); Clamping devices for these tools**
- 61/003 . {Rotary saws comprising an essentially cylindrical body having cutting teeth arranged on its surface}
- 61/006 . {Oscillating saw blades}
- 61/02 . Circular saw blades
- 61/021 . . {Types of set; Variable teeth, e.g. variable in height or gullet depth; Varying pitch; Details of gullet}
- 61/023 . . {with inserted segments having more than one tooth}
- 61/025 . . {Details of saw blade body}
- 61/026 . . . {Composite body, e.g. laminated, body of diverse material}
- 61/028 . . {of special material}
- 61/04 . . with inserted saw teeth {the teeth being individually inserted}
- 61/06 . . . in exchangeable arrangement
- 61/065 {Adjustable teeth}
- 61/08 . . Ring saw blades with internal saw teeth
- 61/10 . . clamped between hubs; Clamping or aligning devices therefor
- 61/12 . Straight saw blades; Strap saw blades
- 61/121 . . {Types of set; Variable teeth, e.g. variable in height or gullet depth; Varying pitch; Details of gullet}
- 61/122 . . {with inserted segments having more than one tooth}
- 61/123 . . {Details of saw blade body}
- 61/125 . . . {Composite body, e.g. laminated, body of diverse material}
- 61/126 . . {having cutting teeth along both edges}
- 61/127 . . {of special material}
- 61/128 . . {Sabre saw blades}
- 61/14 . . with inserted saw teeth {, i.e. the teeth being individually inserted}
- 61/16 . . . in exchangeable arrangement
- 61/18 . Sawing tools of special type, e.g. wire saw strands, saw blades or saw wire equipped with diamonds or other abrasive particles in selected individual positions {(cut-off wheels of bonded abrasive or with inserted abrasive blocks [B24D 5/12](#))}
- 61/185 . . {Saw wires; Saw cables; Twisted saw strips}
- 63/00 Dressing the tools of sawing machines or sawing devices for use in cutting any kind of material, e.g. in the manufacture of sawing tools**
- 63/001 . {Devices for positioning the dressing tool with respect to the saw blade}
- 63/003 . {Saw clamping devices}
- 63/005 . {Workpiece indexing equipment specially adapted to form part of sawing tool dressing machines}
- 63/006 . {Saw teeth setting devices working with setting rollers}
- 63/008 . {using computer control means}
- 63/02 . Setting saw teeth by means of hand-operated {or foot-operated} devices {([B23D 63/006](#) takes precedence)}
- 63/023 . . {Devices of the portable type carried by one hand and operable by one hand or two hands, e.g. having a pair of tongs}
- 63/026 . . {Foot-operated devices}
- 63/04 . Setting saw teeth of circular, straight, or strap saw blades by means of power-operated devices {([B23D 63/006](#) takes precedence)}
- 63/06 . Upsetting the cutting edges of saw teeth, e.g. swaging
- 63/08 . Sharpening the cutting edges of saw teeth
- 63/10 . . by filing
- 63/105 . . . {sharpening circular saw blades}
- 63/12 . . by grinding
- 63/123 . . . {using two or more grinding wheels simultaneously}
- 63/126 . . . {the tool being a grinding worm}
- 63/14 . . Sharpening circular saw blades
- 63/16 . . of chain saws (of mortise chain cutters [B24B 3/14](#))
- 63/162 . . . {by a reciprocating or rotating rod-like sharpening tool, e.g. file, grinding cylinder}
- 63/164 . . . {with tools that remain stationarily positioned during sharpening}
- 63/166 . . . {without removal of the saw chain from the guide bar ([B23D 63/162](#) takes precedence)}
- 63/168 {the saw chain moving around the guide bar}
- 63/18 . Straightening damaged saw blades; Reconditioning the side surface of saw blades, e.g. by grinding
- 63/20 . Combined processes for dressing saw teeth, e.g. both hardening and setting
- 63/201 . . {Combined setting and grinding}
- 63/203 . . {Combined setting and filing}
- 63/205 . . {Combined setting and upsetting}
- 63/206 . . {Combined upsetting and grinding}

- 63/208 . . {Combined upsetting and filing}
- 65/00 Making tools for sawing machines or sawing devices for use in cutting any kind of material**
- 65/02 . Making saw teeth by punching, cutting, or planing
- 65/04 . Making saw teeth by milling

Filing or rasping (sharpening saw teeth thereby [B23D 63/10](#))

- 67/00 Filing or rasping machines or devices (securing arrangements for files or rasps [B23D 71/00](#))**
- 67/02 . with reciprocating tools, mounted on a yoke or the like
- 67/04 . with reciprocating tools, attached to a carrier at one end only
- 67/06 . with rotating tools
- 67/08 . with tools mounted on an endless chain or belt
- 67/10 . for special use, e.g. for filing keys; Accessories therefor
- 67/12 . Hand-held or hand-operated filing or rasping devices ([hand files or rasps \[B23D 71/04\]\(#\)](#))
- 69/00 Filing or rasping machines or devices, characterised only by constructional features of particular parts, e.g. guiding arrangements, drives (constructional features of these parts [per se \[B23Q\]\(#\)](#)); Accessories for filing or rasping (attached to the tool [B23D 71/10](#))**
- 69/02 . Guiding arrangements for hand tools
- 71/00 Filing or rasping tools; Securing arrangements therefor (tool holders for machine tools [B23Q 3/00](#); handles for hand implements [B25G](#))**
- 71/005 . {Rotary files}
- 71/02 . for filing or rasping machines or devices
- 71/025 . . {for rubber-like material}
- 71/04 . Hand files or hand rasps ([carrying or attaching means for tools which are connected to a carrier at both ends \[B23D 51/12\]\(#\); guiding arrangements \[B23D 69/02\]\(#\)](#))
- 71/06 . . using a single interchangeable blade
- 71/08 . . using a plurality of interchangeable cutting elements
- 71/10 . Accessories for filing or rasping tools, e.g. for preventing scoring of workpieces by the edges of the tool
- 73/00 Making files or rasps**
- 73/02 . Preliminary treatment of blanks, e.g. grinding, polishing, specially adapted for the manufacture of files or rasps
- 73/04 . Methods or machines for the manufacture of files or rasps ([non-mechanical methods, \[see the relevant classes\]\(#\)](#))
- 73/06 . . Cutting the working surfaces by means of chisels
- 73/08 . . Milling, planing, slotting, knurling, or broaching the working surfaces
- 73/10 . . Grinding the working surfaces
- 73/12 . . Peculiar procedures for sharpening or otherwise treating the working surfaces ([special treatment by sand-blast \[B24C 1/02\]\(#\); sharpening files by etching \[C23F 1/06\]\(#\)](#))
- 73/14 . Tools or accessories specially adapted for making files or rasps, e.g. chisels, supporting-frames

Reaming bored holes

- 75/00 Reaming machines or reaming devices (tool holders for machine tools [B23Q 3/00](#); handles for hand implements [B25G](#))**
- 75/005 . {Hand-held or hand-operated reaming devices}
- 77/00 Reaming tools**
- 77/003 . {with means for preventing chatter}
- 77/006 . {with means for lubricating or cooling}
- 77/02 . Reamers with inserted cutting edges
- 77/025 . . {Securing arrangements for cutting inserts}
- 77/04 . . with cutting edges adjustable to different diameters along the whole cutting length
- 77/042 . . . {by means of oblique planes}
- 77/044 . . . {by means of screws}
- 77/046 . . . {by means of radial cams}
- 77/048 . . . {by means of conical screw threads}
- 77/06 . Reaming with means for compensating wear ([B23D 77/04 takes precedence](#))
- 77/08 . . by spreading slotted parts of the tool body
- 77/10 . . by expanding a tube-like non-slotted part of the tool body
- 77/12 . Reamers with cutting edges arranged in tapered form
- 77/14 . Reamers for special use, e.g. for working cylinder ridges
- 79/00 Methods, machines, or devices not covered elsewhere, for working metal by removal of material (by combined operations [B23D 81/00](#); cutting by electron-beam [B23K 15/00](#); by laser beam [B23K 26/00](#); by electro-erosion [B23H](#); tool holders for machine tools [B23Q 3/00](#); handles for hand implements [B25G](#))**
- 79/005 . {for thermal deburring ([B23D 79/025 takes precedence](#))}
- 79/02 . Machines or devices for scraping ([turning-machines for bevelling, chamfering, or deburring the ends of bars or tubes \[B23B 5/16\]\(#\)](#))
- 79/021 . . {for removing welding, brazing or soldering burrs, e.g. flash, on pipes or rods}
- 79/023 . . . {internally}
- 79/025 {including other than cutting means, e.g. hot gas}
- 79/026 . . {for removing welding flashes on rails}
- 79/028 . . {for removing welding flashes on chain links}
- 79/04 . . with rotating cutting-tool, e.g. for smoothing linings of bearings
- 79/06 . . with reciprocating cutting-tool
- 79/08 . . Hand scraping-implements
- 79/10 . . Accessories for holding scraping tools or work to be scraped
- 79/12 . Machines or devices for peeling bars or tubes making use of cutting bits arranged around the workpiece, otherwise than by turning ([by turning \[B23B 5/12\]\(#\)](#))
- 81/00 Methods, machines, or devices for working metal, covered by more than one main group in this subclass (in combination with other metal-working operations [B23P 13/00](#), [B23D 23/00](#))**

2277/00 Reaming tools

- 2277/02 . Cutting head and shank made from two different components which are releasably or non-releasably attached to each other
- 2277/04 . Cutting angles
- 2277/06 . Connections between component parts
- 2277/061 . . Brazed connections
- 2277/062 . . Clamping the cutting insert or cutting bit by means of plastic deformation
- 2277/063 . . Clamping the cutting insert or cutting bit using an elastically deformable clamping member
- 2277/064 . . using a specially shaped fixation hole in the cutting insert or cutting bit
- 2277/065 . . Glued connections
- 2277/066 . . using a hollow screw, e.g. for the transmission of coolant
- 2277/067 . . using heating and cooling, i.e. heat shrinking
- 2277/068 . . using a groove in the top face of the cutting insert or bit engaged by a clamp
- 2277/08 . Adjustment mechanisms
- 2277/081 . . for axial adjustment of the cutting edge, cutting insert or cutting bit
- 2277/083 . . with means to prevent the user accessing the adjusting mechanism
- 2277/085 . . comprising hydraulics
- 2277/086 . . comprising gears
- 2277/088 . . with an adjustment screw of special form
- 2277/10 . comprising means for damping of vibration, i.e. for reduction of chatter
- 2277/105 . . with cutting edges located at unequal angles around the periphery of the tool
- 2277/12 . comprising balls
- 2277/14 . Means for burnishing
- 2277/16 . Use of centrifugal force to activate cutting means
- 2277/20 . Number of cutting edges
- 2277/201 . . One
- 2277/202 . . Two
- 2277/203 . . Four
- 2277/204 . . Five
- 2277/205 . . Six
- 2277/206 . . Eight
- 2277/207 . . Nine
- 2277/208 . . Ten
- 2277/24 . Materials of the tool or the intended workpiece, methods of applying these materials
- 2277/2407 . . Applied by chemical vapour deposition [CVD] processes ([coating by chemical vapour deposition in general C23C 16/00](#))
- 2277/2414 . . Applied by physical vapour deposition [PVD] processes ([coating by physical vapour deposition in general C23C 14/00](#))
- 2277/2421 . . Aluminium
- 2277/2428 . . Ceramics, e.g. aluminium oxide or silicone nitride
- 2277/2435 . . Cubic boron nitride [CBN]
- 2277/2442 . . Diamond
- 2277/245 . . . polycrystalline [PCD]
- 2277/2457 . . Elastomers, e.g. rubber
- 2277/2464 . . Hard metal, i.e. cemented carbide
- 2277/2471 . . Steel
- 2277/2478 . . . high speed steel
- 2277/2485 . . Titanium nitride
- 2277/2492 . . Titanium carbide
- 2277/26 . Means for breaking chips
- 2277/28 . Chip collectors
- 2277/30 . Chip guiding means
- 2277/32 . Details of the region preceding the axial cutting edge in the direction of feed
- 2277/34 . comprising cutting inserts made from different materials
- 2277/36 . with the diameter of the tool decreasing in the direction of the shank from the cutting tip
- 2277/38 . comprising eccentrics
- 2277/40 . configured to ream an external surface
- 2277/42 . comprising floating cutting heads
- 2277/44 . comprising chip grooves, i.e. flutes, of special form
- 2277/46 . Guiding pads
- 2277/48 . Guiding rollers
- 2277/50 . configured as a hand tool
- 2277/52 . Details of helices, e.g. helix angles or helices of special form
- 2277/54 . comprising cutting inserts inclined in the axial plane
- 2277/56 . comprising an indication scale
- 2277/58 . Keys, e.g. spanners or allen keys, for assembling or disassembling the reaming tool
- 2277/60 . comprising means for lubrication or cooling
- 2277/62 . Margins, i.e. the area on the circumference of the tool immediately behind the axial cutting edge
- 2277/64 . Markings, letters or numbers
- 2277/66 . Measurement of the tool or bore
- 2277/68 . Pilots
- 2277/70 . Polygonal sections, e.g. for torque transmission between parts able to be uncoupled
- 2277/72 . comprising a body having a special profile, i.e. having a special cross section
- 2277/74 . comprising serrations
- 2277/76 . Shims
- 2277/78 . for use with holes associated with spark plugs or glow plugs
- 2277/80 . comprising a spring
- 2277/82 . for producing a stepped bore
- 2277/84 . with tangentially mounted cutting inserts
- 2277/86 . comprising a thread