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 . Pivoted mounted holders
13/04 . Holders for tool sets
Planing; Slotting

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
  15/005 (for cutting in more than one direction, e.g. angle cutting)
  15/00/5 (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 15/00 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 cooperating 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)
  23/005 . . [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)]

23/02 . . for performing different cutting operations on travelling stock, e.g. slitting and severing simultaneously
Shearing; Similar cutting

Broaching machines or broaching devices

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)

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 (sawing 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 45/064 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]
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 B25P 5/00)

- 47/005 [Vibration-damping]
- 47/002 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)]

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 . . . [the saw blade being 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 . . [the saw blade being 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 mitered 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)
Sawing

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

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 . . . . with 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

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)

Sawing machines or sawing devices not covered by one of the preceding groups
B23D 45/00 - B23D 55/00
57/0  . . using saw wires
57/007 . . . . [hand-held or hand-operated]
57/023 . . . . {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)
57/008 . . . . {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]
Sawing

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 clamped between hubs; Clamping or aligning devices therefor]
61/10 . . 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}
63/13 . . . . 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}
Filling or rasping (sharpening saw teeth thereby B23D 63/10)

67/00 Filling 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 filling 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, sloting, 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 beveling, 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
Chip collectors

Means for breaking chips

Methods of applying these materials

Materials of the tool or the intended workpiece,

Connection between component parts

Cutting angles

Connections between component parts

Brazed connections

Clamping the cutting insert or cutting bit by means of plastic deformation

Clamping the cutting insert or cutting bit using an elastically deformable clamping member

using a specially shaped fixation hole in the cutting insert or cutting bit

Glued connections

using a hollow screw, e.g. for the transmission of coolant

using heating and cooling, i.e. heat shrinking

using a groove in the top face of the cutting insert or bit engaged by a clamp

Adjustment mechanisms

for axial adjustment of the cutting edge, cutting insert or cutting bit

with means to prevent the user accessing the adjusting mechanism

comprising hydraulics

comprising gears

with an adjustment screw of special form

comprising means for damping of vibration, i.e. for reduction of chatter

with cutting edges located at unequal angles around the periphery of the tool

comprising balls

Means for burnishing

Use of centrifugal force to activate cutting means

Number of cutting edges

One

Two

Four

Five

Six

Eight

Nine

Ten

Materials of the tool or the intended workpiece,

methods of applying these materials

Applied by chemical vapour deposition [CVD] processes (coating by chemical vapour deposition in general C23C 16/00)

Applied by physical vapour deposition [PVD] processes (coating by physical vapour deposition in general C23C 14/00)

Aluminium

Ceramics, e.g. aluminium oxide or silicone nitride

Cubic boron nitride [CBN]

Diamond

Polycrystalline [PCD]

Elastomers, e.g. rubber

Hard metal, i.e. cemented carbide

Steel

high speed steel

Titanium nitride

Titanium carbide

Means for breaking chips

Chip guiding means

Details of the region preceding the axial cutting edge in the direction of feed

comprising cutting inserts made from different materials

with the diameter of the tool decreasing in the direction of the shank from the cutting tip

comprising eccentrics

configured to ream an external surface

comprising floating cutting heads

comprising chip grooves, i.e. flutes, of special form

Guiding pads

Guiding rollers

configured as a hand tool

Details of helices, e.g. helix angles or helices of special form

comprising cutting inserts inclined in the axial plane

comprising an indication scale

Keys, e.g. spanners or allen keys, for assembling or disassembling the reaming tool

comprising means for lubrication or cooling

Margins, i.e. the area on the circumference of the tool immediately behind the axial cutting edge

Markings, letters or numbers

Measurement of the tool or bore

Pilots

Polygonal sections, e.g. for torque transmission between parts able to be uncoupled

comprising a body having a special profile, i.e. having a special cross section

comprising serrations

Shims

for use with holes associated with spark plugs or glow plugs

comprising a spring

for producing a stepped bore

with tangentially mounted cutting inserts

comprising a thread