

CPC**COOPERATIVE PATENT CLASSIFICATION****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](#))

Planing; Slotting**B23D 1/00****Planing or slotting machines cutting by relative movement of the tool and workpiece in a horizontal straight line only**[B23D 1/003](#)

- {for planing elongated workpieces}

[B23D 1/006](#)

- • {Rails}

[B23D 1/02](#)

- by movement of the work-support

[B23D 1/04](#)

- • with the tool supported only on one side of the bed

[B23D 1/06](#)

- • with the tool supported on both sides of the bed

[B23D 1/08](#)

- by movement of the tool

[B23D 1/10](#)

- • with means for adjusting the tool-guide vertically

[B23D 1/12](#)

- • • with the tool supported only on one side of the bed

[B23D 1/14](#)

- • • with the tool supported on both sides of the bed

[B23D 1/16](#)

- • without means for adjusting the tool-guide vertically

[B23D 1/18](#)

- cutting on both the forward and the return stroke

[B23D 1/20](#)

- with tool-supports or work-supports specially mounted or guided for working in different directions or at different angles; Special purpose machines

[B23D 1/205](#)

- • {Planing nuts, bolt heads or other prismatic workpieces}

[B23D 1/22](#)

- • for planing ingots or the like (scrubbing or peeling ingots by milling [B23C 3/14](#))

[B23D 1/24](#)

- • for planing inner surfaces, e.g. of moulds

[B23D 1/26](#)

- • for planing edges or ridges or cutting grooves (cutting helical grooves [B23D 5/02](#))

[B23D 1/28](#)

- • in which the tool or workpiece is fed otherwise than in a straight line, e.g. for planing profiled stock

[B23D 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](#))

B23D 3/00**Planing or slotting machines cutting by relative movement of the tool and workpiece in a vertical or inclined straight line**[B23D 3/02](#)

- for cutting grooves (cutting helical grooves [B23D 5/02](#))

[B23D 3/04](#)

- in which the tool or workpiece is fed otherwise than in a straight line

[B23D 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](#))

B23D 5/00	Planing or slotting machines cutting otherwise than by relative movement of the tool and workpiece in a straight line
B23D 5/02	<ul style="list-style-type: none"> involving rotary and straight-line movements only, e.g. for cutting helical grooves
B23D 5/04	<ul style="list-style-type: none"> controlled by a copying device, e.g. by a pattern (features of copying devices B23Q 35/00)
B23D 7/00	Planing or slotting machines characterised only by constructional features of particular parts (constructional features of these parts per se B23Q)
B23D 7/02	<ul style="list-style-type: none"> of frames; of work-table beds
B23D 7/04	<ul style="list-style-type: none"> of pillars, of cross-beams
B23D 7/06	<ul style="list-style-type: none"> of tool-carrying arrangements
B23D 7/08	<ul style="list-style-type: none"> of work-tables
B23D 7/10	<ul style="list-style-type: none"> of drives for reciprocating parts
B23D 7/105	<ul style="list-style-type: none"> <ul style="list-style-type: none"> {hydraulically driven}
B23D 7/12	<ul style="list-style-type: none"> of arrangements for impact damping or regenerating energy
B23D 9/00	Hand-operated planing devices; Portable planing apparatus
B23D 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
B23D 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)
B23D 13/005	<ul style="list-style-type: none"> {Tools or tool holders adapted to operate in both the forward and return stroke}
B23D 13/02	<ul style="list-style-type: none"> Pivotally-mounted holders
B23D 13/04	<ul style="list-style-type: none"> Holders for tool sets
B23D 13/06	<ul style="list-style-type: none"> Devices for lifting or lowering the tool

Shearing; Similar cutting

B23D 15/00	Shearing machines or shearing devices cutting by blades which move parallel to themselves
B23D 15/002	<ul style="list-style-type: none"> {for cutting in more than one direction, e.g. angle cutting}
B23D 15/005	<ul style="list-style-type: none"> {for bias cutting of webs or sheets}
B23D 2015/007	<ul style="list-style-type: none"> {reciprocating horizontally}
B23D 15/02	<ul style="list-style-type: none"> having both upper and lower moving blades
B23D 15/04	<ul style="list-style-type: none"> having only one moving blade
B23D 15/06	<ul style="list-style-type: none"> Sheet shears {(B23D 15/002 and B23D 15/005 take precedence)}
B23D 15/08	<ul style="list-style-type: none"> <ul style="list-style-type: none"> with a blade moved in one plane, e.g. perpendicular to the surface of the sheet
B23D 15/10	<ul style="list-style-type: none"> <ul style="list-style-type: none"> with a blade moved in a curved surface, e.g. for producing an edge with a curved cross-section

- B23D 15/12 . characterised by drives or gearings therefor
- B23D 15/14 . . actuated by fluid or gas pressure
- B23D 15/145 . . . {actuated by explosion}

- B23D 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](#))
- B23D 17/02 . characterised by drives or gearings therefor
- B23D 17/04 . . actuated by a rotary shaft
- B23D 17/06 . . actuated by fluid or gas pressure
- B23D 17/08 . . actuated by hand or foot operated lever mechanism

- B23D 19/00** **Shearing machines or shearing devices cutting by rotary discs** (by friction saw-discs [B23D 45/00](#))
- B23D 19/02 . having both a fixed shearing blade and a rotary shearing disc
- B23D 19/04 . having rotary shearing discs arranged in co-operating pairs
- B23D 19/06 . . with several spaced pairs of shearing discs working simultaneously, e.g. for trimming or making strips
- B23D 19/065 . . . {for cutting along lines not parallel to the longitudinal direction of the material, e.g. oblique or zig-zag cutting}
- B23D 19/08 . for special use, e.g. for cutting curves, for chamfering edges

- B23D 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](#))
- B23D 21/003 . {by tools working in different directions successively}
- B23D 21/006 . {and sealing, crushing or chamfering the tubes}
- B23D 21/02 . otherwise than in a plane perpendicular to the axis of the tube, e.g. for making mitred cuts, for making bicycle frames
- B23D 21/04 . Tube-severing machines with rotating tool-carrier
- B23D 21/06 . Hand-operated tube-cutters
- B23D 21/08 . . with cutting wheels
- B23D 21/10 . . with other cutting blades or tools
- B23D 21/12 . . . with provision for hammering on the tool
- B23D 21/14 . cutting inside the tube
- B23D 21/145 . . {hand operated}

- B23D 23/00** **Machines or devices for shearing or cutting profiled stock** (hand-held devices [B23D 29/00](#))
- B23D 2023/005 . {for window coverings}
- B23D 23/02 . otherwise than in a plane perpendicular to the axis of the stock
- B23D 23/04 . by means of holding-dies, arranged side by side, subjecting the stock to torsional stress

B23D 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)
B23D 25/02	<ul style="list-style-type: none"> • Flying shearing machines (B23D 25/12 takes precedence)
B23D 25/04	<ul style="list-style-type: none"> • in which a cutting unit moves bodily with the work while cutting (B23D 25/06 takes precedence)
B23D 25/06	<ul style="list-style-type: none"> • having a cutting device mounted on an oscillating lever
B23D 25/08	<ul style="list-style-type: none"> • having two coacting shearing blades mounted independently
B23D 25/10	<ul style="list-style-type: none"> • on co-operating beams moving parallel to each other and attached to lever mechanisms
B23D 25/12	<ul style="list-style-type: none"> • shearing machines with blades on coacting rotating drums
B23D 25/14	<ul style="list-style-type: none"> • without regard to the exact dimensions of the resulting material, e.g. for cutting-up scrap
B23D 27/00	Machines or devices for cutting by a nibbling action
B23D 27/02	<ul style="list-style-type: none"> • Hand-held devices
B23D 27/04	<ul style="list-style-type: none"> • actuated by electric power
B23D 27/06	<ul style="list-style-type: none"> • actuated by fluid or gas pressure
B23D 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)
B23D 29/002	<ul style="list-style-type: none"> • {for cutting wire or the like}
B23D 29/005	<ul style="list-style-type: none"> • {for cutting sheets}
B23D 29/007	<ul style="list-style-type: none"> • {for splitting nuts (hand operated tools with cutting action actuated by muscle power B26B 17/003)}
B23D 29/02	<ul style="list-style-type: none"> • Hand-operated metal-shearing devices
B23D 29/023	<ul style="list-style-type: none"> • {for cutting wires}
B23D 29/026	<ul style="list-style-type: none"> • {for cutting sheets}
B23D 31/00	Shearing machines or shearing devices covered by none or more than one of the groups B23D 15/00 to B23D 29/00; Combinations of shearing machines
B23D 31/001	<ul style="list-style-type: none"> • {for trimming deep drawn products (combined with deep-drawing presses B21D 24/16)}
B23D 31/002	<ul style="list-style-type: none"> • {Breaking machines, i.e. pre-cutting and subsequent breaking}
B23D 31/003	<ul style="list-style-type: none"> • {for rings}
B23D 2031/005	<ul style="list-style-type: none"> • {Cap holders therefor}
B23D 2031/006	<ul style="list-style-type: none"> • {for gangs}
B23D 2031/007	<ul style="list-style-type: none"> • {for journals}
B23D 31/008	<ul style="list-style-type: none"> • {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)}
B23D 31/02	<ul style="list-style-type: none"> • for performing different cutting operations on travelling stock, e.g. slitting and severing simultaneously

- B23D 31/04 . for trimming stock combined with devices for shredding scrap

B23D 33/00 **Accessories for shearing machines or shearing devices** (feeding stock to machines or removing stock [B21D 43/00](#))

- B23D 33/003 . {for obtaining pieces of a predetermined weight or volume, e.g. control arrangements ([B23D 36/0025](#) takes precedence)}
- B23D 33/006 . {for obtaining pieces of a predetermined length, e.g. control arrangements ([B23D 36/0033](#) takes precedence)}
- B23D 33/02 . Arrangements for holding, guiding, and/or feeding work during the operation
- B23D 33/025 . . {Guillotines with holding means behind the knives}
- B23D 33/04 . . for making circular cuts
- B23D 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](#))
- B23D 33/08 . Press-pads; Counter-bases; Hold-down devices
- B23D 33/10 . Stop for positioning work
- B23D 33/12 . Equipment for indicating where to cut

B23D 35/00 **Tools for shearing machines or shearing devices; Holders or chucks for shearing tools**

- B23D 35/001 . {cutting members}
- B23D 35/002 . {Means for mounting the cutting members}
- B23D 35/004 . . {for circular cutting members}
- B23D 35/005 . {Adjusting the position of the cutting members}
- B23D 35/007 . . {for circular cutting members}
- B23D 35/008 . {Means for changing the cutting members ([mounting per se B23D 35/002](#))}

B23D 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**

- B23D 36/0008 . {for machines with only one cutting, sawing, or shearing devices}
- B23D 36/0016 . . {for minimising waste}
- B23D 36/0025 . . {for obtaining pieces of a predetermined weight or volume}
- B23D 36/0033 . . {for obtaining pieces of a predetermined length}
- B23D 36/0041 . . . {the tool moving continuously}
- B23D 36/005 {and taking account of marks, e.g. on the stock}
- B23D 36/0058 . . . {the tool stopping for a considerable time after each cutting operation}
- B23D 36/0066 {and taking account of marks, e.g. on the stock}
- B23D 36/0075 . . . {and taking account of the temperature of the stock}
- B23D 36/0083 . . {for cutting off of the ends of the products, e.g. cropping shears}
- B23D 36/0091 . {for machines with more than one cutting, shearing, or sawing devices}

NOTE

Broaching

B23D 37/00**Broaching machines or broaching devices**

B23D 37/005

- {for cylindrical workpieces, e.g. crankshafts (takes precedence over other subgroups)}

B23D 37/02

- Broaching machines with horizontally-arranged working tools

B23D 37/04

- . for broaching inner surfaces

B23D 37/06

- . for broaching outer surfaces

B23D 37/08

- Broaching machines with vertically-arranged working tools

B23D 37/10

- . for broaching inner surfaces

B23D 37/12

- . for broaching outer surfaces

B23D 37/14

- Broaching machines with rotatably-arranged working tools

B23D 37/16

- . for broaching helical grooves

B23D 37/18

- Broaching machines with working tools mounted on an endless chain or belt

B23D 37/20

- Broaching machines with arrangements for working in opposite directions

B23D 37/22

- for special purposes (B23D 37/14 takes precedence)

B23D 39/00**Accessories for broaching machines or broaching devices****B23D 41/00****Broaching machines or broaching devices characterised only by constructional features of particular parts (constructional features of these parts per se B23Q)**

B23D 41/02

- of frames; of work supports

B23D 41/04

- of tool-carrying arrangements

B23D 41/06

- of devices for feeding, clamping, or ejecting workpieces

B23D 41/08

- of drives; of control devices

B23D 41/083

- . {Hydraulic drives}

B23D 41/086

- . {Control devices}

B23D 43/00**Broaching tools (for cutting gear teeth B23F 21/26)**

B23D 43/005

- {for cutting helical grooves}

B23D 43/02

- for cutting by rectilinear movement (B23D 43/08 takes precedence)

B23D 2043/025

- . {for producing grooves in turbines, e.g. for the insertion of blades}

B23D 43/04

- . having inserted cutting edges

B23D 43/06

- for cutting by rotational movement

B23D 2043/063

- . {with cutters mounted externally}

B23D 2043/066

- . {with cutters mounted internally}

B23D 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})**B23D 45/00****Sawing machines or sawing devices with circular saw blades or with friction saw discs (shearing machines with rotary discs B23D 19/00 to B23D 25/00)**

B23D 45/003

- {for particular purposes}

- B23D 45/006 . {with means to attach the sawing device to the workpiece}
- B23D 45/02 . with a circular saw blade or the stock mounted on a carriage
- B23D 45/021 . . {with the saw blade mounted on a carriage (B23D 45/06, B23D 45/046 take precedence)}
- B23D 45/022 . . . {the carriage performing a vertical movement only}
- B23D 45/024 . . . {the saw blade being adjustable according to depth or angle of cut (B23D 45/022 takes precedence)}
- B23D 45/025 {Radial sawing machines}
- B23D 45/027 . . . {the saw carriage being mounted on a carriage, e.g. gantry-type sawing machines}
- B23D 45/028 . . . {the saw carriage being mounted on a pivoted lever}
- B23D 45/04 . with a circular saw blade or the stock carried by a pivoted lever
- B23D 45/042 . . {with the saw blade carried by a pivoted lever (B23D 45/028, B23D 45/065 take precedence)}
- B23D 45/044 . . . {the saw blade being adjustable according to angle of cut (B23D 45/025 takes precedence)}
- B23D 45/046 . . . {the pivoted lever being mounted on a carriage}
- B23D 45/048 {the saw blade being adjustable according to angle of cut}
- B23D 45/06 . with a circular saw blade arranged underneath a stationary work-table
- B23D 45/061 . . {the saw blade being mounted on a carriage}
- B23D 45/062 . . . {the saw blade being adjustable according to depth or angle of cut}
- B23D 45/063 . . . {the carriage performing a vertical movement only}
- B23D 45/065 . . {with the saw blade carried by a pivoted lever}
- B23D 45/066 . . . {the pivoted lever being mounted on a carriage}
- B23D 45/067 . . . {the saw blade being adjustable according to depth or angle of cut}
- B23D 45/068 . . {the saw blade being adjustable according to depth or angle of cut (B23D 45/061, B23D 45/065 take precedence)}
- B23D 45/08 . with a ring blade having inside saw teeth
- B23D 45/10 . with a plurality of circular saw blades {(B23D 45/143, B23D 45/165 take precedence)}
- B23D 45/102 . . {some of which turn about perpendicular axes (B23D 45/143 takes precedence)}
- B23D 45/105 . . {operating within the same plane}
- B23D 45/107 . . {mounted on a turret}
- B23D 45/12 . with a circular saw blade for cutting tubes
- B23D 45/122 . . {for cutting slots in tubes}
- B23D 45/124 . . {the workpieces turning about their longitudinal axis during the cutting operations}
- B23D 45/126 . . {with the tool turning around the workpieces}
- B23D 45/128 . . {with the tool introduced into the tubes and cutting from the inside outwards}
- B23D 45/14 . for cutting otherwise than in a plane perpendicular to the axis of the stock, e.g. for making a mitred cut
- B23D 45/143 . . {with a plurality of circular saw blades}

- B23D 45/146 . . . {the saw blades being angularly fixed}
- B23D 45/16 . Hand-held sawing devices with circular saw blades
- B23D 45/165 . . {with a plurality of saw blades or saw blades having plural cutting zones}
- B23D 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](#))
- B23D 45/20 . . Flying sawing machines, the saw carrier of which is reciprocated in a guide and moves with the travelling stock during sawing
- B23D 45/22 . . Flying sawing machines with lever-supported saw carrier which moves in a complete circular path
- B23D 45/24 . . Flying sawing machines with lever-supported saw carrier which oscillates in an arc
- B23D 45/26 . with high-speed cutting discs, performing the cut by frictional heat melting the material ([grinders for cutting-off B24B 27/06](#))

B23D 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](#))

- B23D 47/005 . {Vibration-damping}
- B23D 47/02 . of frames; of guiding arrangements for work-table or saw-carrier
- B23D 47/025 . . {of tables}
- B23D 47/04 . of devices for feeding, positioning, clamping, or rotating work
- B23D 47/042 . . {for conveying work to, or discharging work from, the machine}
- B23D 47/045 . . {feeding work into engagement with the saw blade}
- B23D 47/047 . . . {the work being mounted on rotating work support}
- B23D 47/06 . . for stock of indefinite length
- B23D 47/065 . . . {for laterally feeding long workpieces}
- B23D 47/08 . of devices for bringing the circular saw blade to the workpiece or removing same therefrom
- B23D 47/10 . . actuated by fluid or gas pressure
- B23D 47/12 . of drives for circular saw blades
- B23D 47/123 . . {acting on the disc of the saw blade}
- B23D 47/126 . . {Angle drives}

B23D 49/00 **Machines or devices for sawing with straight reciprocating saw blades, e.g. hacksaws**

- B23D 49/001 . {transportable, e.g. fitted with wheels}
- B23D 49/002 . {with means to attach the sawing device to the work}
- B23D 49/003 . {having a plurality of saw blades or saw blades having plural cutting zones}
- B23D 49/005 . . {with opposed saw blades}
- B23D 49/006 . . {with contiguous, oppositely reciprocating saw blades}
- B23D 49/007 . {Jig saws, i.e. machine saws with a vertically reciprocating narrow saw blade chucked at both ends for contour cutting}

- B23D 49/008 . . {hand-driven or foot-driven}
- B23D 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
- B23D 49/04 . Hacksaw machines with straight saw blades secured to a pivotally-arranged frame
- B23D 49/06 . Hacksaw machines with straight saw blades for special use
- B23D 49/08 . Pad-saw machines, i.e. machines in which the blade is attached to a carrier at one end only
- B23D 49/10 . Hand-held or hand-operated sawing devices with straight saw blades
- B23D 49/105 . . {with means for guiding the sawing device}
- B23D 49/11 . . for special purposes, e.g. offset-blade hand; {Hand saws having spaced blades; Hand saws for sawing grooves or square holes}
- B23D 49/12 . . Hacksaws (B23D 49/11, B23D 49/16 take precedence; bows adjustable in length or height B23D 51/12)
- B23D 49/125 . . . {with wire-type frames}
- B23D 49/14 . . Pad saws {(B23D 49/105, B23D 49/11, B23D 49/16 take precedence)}
- B23D 49/16 . . actuated by electric or magnetic power or prime movers (B23D 49/11 takes precedence)
- B23D 49/162 . . . {Pad sawing devices}
- B23D 49/165 {with means to move the saw blades in an orbital path}
- B23D 49/167 {with means to adjust the guide plate or with means to adjust the plane in which the saw blade moves}

- B23D 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**
- B23D 51/005 . {Devices for moving the tool to the workpiece}
- B23D 51/01 . characterised by the handle
- B23D 51/02 . of beds; of guiding arrangements for work-tables or saw carriers; of frames
- B23D 51/025 . . {of arrangements for guiding the saw blade}
- B23D 51/03 . . with extensible or collapsible frames; {Frames with spare blade storage means}
- B23D 51/04 . of devices for feeding, positioning, clamping, or rotating work
- B23D 51/043 . . {for conveying work to, or discharging work from, the machine}
- B23D 51/046 . . {for feeding work into engagement with the saw blade, e.g. rotating work while sawing}
- B23D 51/06 . . for stock of indefinite length
- B23D 51/065 . . . {for laterally feeding long workpieces}
- B23D 51/08 . of devices for mounting straight saw blades or other tools
- B23D 51/10 . . for hand-held or hand-operated devices
- B23D 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

- B23D 51/125 . . . {Blade tensioning means}
- B23D 51/14 . . . Attachment of the tool
- B23D 51/16 . of drives or feed mechanisms for straight tools, e.g. saw blades, or bows
- B23D 51/163 . . {Vibratory electromagnetic drives therefor}
- B23D 51/166 . . {Devices for arresting movement of the saw blades ([B23D 51/20](#) takes precedence)}
- B23D 51/18 . . actuated by fluid or gas pressure ([B23D 51/20](#) takes precedence)
- B23D 51/20 . . with controlled feed of the tool, or with special arrangements for relieving or lifting the tool on the return stroke

B23D 53/00 Machines or devices for sawing with strap saw-blades which are effectively endless in use, e.g. for contour cutting

- B23D 53/001 . {transportable, e.g. fitted with wheels}
- B23D 53/003 . {with means to attach the sawing device to the workpiece}
- B23D 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](#))}
- B23D 53/006 . {Convertible sawing devices}
- B23D 53/008 . {Open-end band saws}
- B23D 53/02 . with stationarily-mounted wheels, {i.e. during sawing} carrying the strap ([B23D 53/06](#) takes precedence)
- B23D 53/023 . . {Arrangements for tilting the head carrying the saw wheels}
- B23D 53/026 . . {the band saw blade being guided in a horizontal plane}
- B23D 53/04 . with the wheels carrying the strap mounted shiftably or swingingly, {i.e. during sawing}, other than merely for adjustment
- B23D 53/045 . . {with pivotably mounted head carrying the saw wheels}
- B23D 53/06 . with shiftable or swinging work-table
- B23D 53/08 . for cutting profiled stock
- B23D 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
- B23D 53/12 . Hand-held or hand-operated sawing devices working with strap saw blades

B23D 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](#))

- B23D 55/005 . {Devices for damping vibrations}
- B23D 55/02 . of frames; of tables
- B23D 55/023 . . {of tables ([B23D 53/06](#) takes precedence)}
- B23D 55/026 . . . {the table being adjustable according to depth or angle of cut}
- B23D 55/04 . of devices for feeding or clamping work
- B23D 55/043 . . {for conveying work to the sawing machine}
- B23D 55/046 . . {for feeding work into engagement with the saw blade ([B23D 53/06](#) takes precedence)}
- B23D 55/06 . of drives for strap saw blades; of wheel mountings

- B23D 55/065 . . {of wheels}
- B23D 55/08 . of devices for guiding or feeding strap saw blades
- B23D 55/082 . . {Devices for guiding strap saw blades}
- B23D 55/084 . . . {which automatically detect or correct band saw blade deflection}
- B23D 55/086 . . . {with means for automatically adjusting the distance between the guides}
- B23D 55/088 . . {Devices for feeding strap saw blades}
- B23D 55/10 . of devices for tensioning strap saw blades ([B23D 55/06](#) takes precedence; incorporated in the strap [B23D 61/12](#))

B23D 57/00**Sawing machines or sawing devices not covered by one of the preceding groups [B23D 45/00](#) to [B23D 55/00](#)**

- B23D 57/0007 . {using saw wires}
- B23D 57/0015 . . {hand-held or hand-operated}
- B23D 57/0023 . . {with a plurality of saw wires or saw wires having plural cutting zones}
- B23D 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](#))}
- B23D 57/0038 . . {of frames; of tables}
- B23D 57/0046 . . {of devices for feeding, conveying or clamping work}
- B23D 57/0053 . . {of drives for saw wires; of wheel mountings; of wheels}
- B23D 57/0061 . . {of devices for guiding or feeding saw wires}
- B23D 57/0069 . . {of devices for tensioning saw wires}
- B23D 57/0076 . {Devices for converting any machine for sawing purposes}
- B23D 57/0084 . {specially adapted for sawing under water or at places accessible with difficulty}
- B23D 57/0092 . {dismountable, collapsible or transportable, e.g. by means of a carrying case}
- B23D 57/02 . with chain saws
- B23D 57/023 . . {hand-held or hand-operated}
- B23D 57/026 . . {with a plurality of saw chains}

B23D 59/00**Accessories specially designed for sawing machines or sawing devices ([lubricating or cooling machine tools in general B23Q 11/12](#))**

- B23D 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](#))}
- B23D 59/002 . . {for the position of the saw blade ([B27B 5/36](#) and [B27B 9/02](#) take precedence)}
- B23D 59/003 . . . {Indicating the cutting plane on the workpiece, e.g. by projecting a laser beam}
- B23D 59/005 . . {for preventing collision of saw blades with other machine parts or workpieces}
- B23D 59/006 . {for removing or collecting chips}
- B23D 59/007 . {for mounting a portable sawing device on a frame part}
- B23D 59/008 . {comprising computers}
- B23D 59/02 . Devices for lubricating or cooling circular saw blades

- B23D 59/025
 - . . {the lubricating or cooling medium being applied through the mounting means of the tool, e.g. the tool spindle or hub}
- B23D 59/04
 - . Devices for lubricating or cooling straight or strap saw blades
- B23D 61/00**
Tools for sawing machines or sawing devices (tools for trepanning [B23B 51/04](#)); Clamping devices for these tools
- B23D 61/003
 - . {Rotary saws comprising an essentially cylindrical body having cutting teeth arranged on its surface}
- B23D 61/006
 - . {Oscillating saw blades}
- B23D 61/02
 - . Circular saw blades
- B23D 61/021
 - . . {Types of set; Variable teeth, e.g. variable in height or gullet depth: Varying pitch; Details of gullet}
- B23D 61/023
 - . . {with inserted segments having more than one tooth}
- B23D 61/025
 - . . {Details of saw blade body}
- B23D 61/026
 - . . . {Composite body, e.g. laminated, body of diverse material}
- B23D 61/028
 - . . {of special material}
- B23D 61/04
 - . . with inserted saw teeth {the teeth being individually inserted}
- B23D 61/06
 - . . . in exchangeable arrangement
- B23D 61/065
 - {Adjustable teeth}
- B23D 61/08
 - . . Ring saw blades with internal saw teeth
- B23D 61/10
 - . . clamped between hubs; Clamping or aligning devices therefor
- B23D 61/12
 - . Straight saw blades; Strap saw blades
- B23D 61/121
 - . . {Types of set; Variable teeth, e.g. variable in height or gullet depth; Varying pitch; Details of gullet}
- B23D 61/122
 - . . {with inserted segments having more than one tooth}
- B23D 61/123
 - . . {Details of saw blade body}
- B23D 61/125
 - . . . {Composite body, e.g. laminated, body of diverse material}
- B23D 61/126
 - . . {having cutting teeth along both edges}
- B23D 61/127
 - . . {of special material}
- B23D 61/128
 - . . {Sabre saw blades}
- B23D 61/14
 - . . with inserted saw teeth, {i.e. the teeth being individually inserted}
- B23D 61/16
 - . . . in exchangeable arrangement
- B23D 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](#))}
- B23D 61/185
 - . . {Saw wires; Saw cables; Twisted saw strips}
- B23D 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
- B23D 63/001
 - . {Devices for positioning the dressing tool with respect to the saw blade}
- B23D 63/003
 - . {Saw clamping devices}
- B23D 63/005
 - . {Workpiece indexing equipment specially adapted to form part of sawing tool dressing machines}

- B23D 63/006 . {Saw teeth setting devices working with setting rollers}
- B23D 63/008 . {using computer control means}
- B23D 63/02 . Setting saw teeth by means of hand-operated {or foot-operated} devices
{(B23D 63/006 takes precedence)}
- B23D 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}
- B23D 63/026 . . {Foot-operated devices}
- B23D 63/04 . Setting saw teeth of circular, straight, or strap saw blades by means of power-
operated devices {(B23D 63/006 takes precedence)}
- B23D 63/06 . Upsetting the cutting edges of saw teeth, e.g. swaging
- B23D 63/08 . Sharpening the cutting edges or saw teeth
- B23D 63/10 . . by filing
- B23D 63/105 . . . {sharpening circular saw blades}
- B23D 63/12 . . by grinding
- B23D 63/123 . . . {using two or more grinding wheels simultaneously}
- B23D 63/126 . . . {the tool being a grinding worm}
- B23D 63/14 . . . Sharpening circular saw blades
- B23D 63/16 . . of chain saws (of mortise chain cutters B24B 3/14)
- B23D 63/162 . . . {by a reciprocating or rotating rod-like sharpening tool, e.g. file, grinding
cylinder}
- B23D 63/164 . . . {with tools that remain stationarily positioned during sharpening}
- B23D 63/166 . . . {without removal of the saw chain from the guide bar (B23D 63/162 takes
precedence)}
- B23D 63/168 {the saw chain moving around the guide bar}
- B23D 63/18 . Straightening damaged saw blades; Reconditioning the side surface of saw
blades, e.g. by grinding
- B23D 63/20 . Combined processes for dressing saw teeth, e.g. both hardening and setting
- B23D 63/201 . . {Combined setting and grinding}
- B23D 63/203 . . {Combined setting and filing}
- B23D 63/205 . . {Combined setting and upsetting}
- B23D 63/206 . . {Combined upsetting and grinding}
- B23D 63/208 . . {Combined upsetting and filing}
- B23D 65/00** **Making tools for sawing machines or sawing devices for use in cutting any
kind of material**
- B23D 65/02 . Making saw teeth by punching, cutting, or planing
- B23D 65/04 . Making saw teeth by milling

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

- B23D 67/00** **Filing or rasping machines or devices** (securing arrangements for files or rasps
B23D 71/00)
- B23D 67/02 . with reciprocating tools, mounted in a yoke or the like

- B23D 67/04 . with reciprocating tools, attached to a carrier at one end only
- B23D 67/06 . with rotating tools
- B23D 67/08 . with tools mounted on an endless chain or belt
- B23D 67/10 . for special use, e.g. for filing keys; Accessories therefor
- B23D 67/12 . Hand-held or hand-operated filing or rasping devices ([hand files or rasps B23D 71/04](#))

- B23D 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](#))
- B23D 69/02 . Guiding arrangements for hand tools

- B23D 71/00** **Filing or rasping tools; Securing arrangements therefor** ([tool holders for machine tools B23Q 3/00](#); [handles for hand implements B25G](#))
- B23D 71/005 . {Rotary files}
- B23D 71/02 . for filing or rasping machines or devices
- B23D 71/025 . . {for rubber-like material}
- B23D 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](#))
- B23D 71/06 . . using a single interchangeable blade
- B23D 71/08 . . using a plurality of interchangeable cutting elements
- B23D 71/10 . Accessories for filing or rasping tools, e.g. for preventing scoring of workpieces by the edges of the tool

- B23D 73/00** **Making files or rasps**
- B23D 73/02 . Preliminary treatment of blanks, e.g. grinding, polishing, specially adapted for the manufacture of files or rasps
- B23D 73/04 . Methods or machines for the manufacture of files or rasps ([non-mechanical methods, see the relevant classes](#))
- B23D 73/06 . . Cutting the working surfaces by means of chisels
- B23D 73/08 . . Milling, planing, slotting, knurling, or broaching the working surfaces
- B23D 73/10 . . Grinding the working surfaces
- B23D 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](#))
- B23D 73/14 . Tools or accessories specially adapted for making files or rasps, e.g. chisels, supporting-frames

Reaming bored holes

- B23D 75/00** **Reaming machines or reaming devices** ([tool holders for machine tools B23Q 3/00](#); [handles for hand implements B25G](#))
- B23D 75/005 . {Hand-held or hand-operated reaming devices}

B23D 77/00**Reaming tools**

- B23D 77/003 . {with means for preventing chatter}
- B23D 77/006 . {with means for lubricating or cooling}
- B23D 77/02 . Reamers with inserted cutting edges
- B23D 77/025 . . {Securing arrangements for cutting inserts}
- B23D 77/04 . . with cutting edges adjustable to different diameters along the whole cutting length
- B23D 77/042 . . . {by means of oblique planes}
- B23D 77/044 . . . {by means of screws}
- B23D 77/046 . . . {by means of radial cams}
- B23D 77/048 . . . {by means of conical screw threads}
- B23D 77/06 . Reaming with means for compensating wear ([B23D 77/04](#) takes precedence)
- B23D 77/08 . . by spreading slotted parts of the tool body
- B23D 77/10 . . by expanding a tube-like non-slotted part of the tool body
- B23D 77/12 . Reamers with cutting edges arranged in tapered form
- B23D 77/14 . Reamers for special use, e.g. for working cylinder ridges

B23D 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](#))

- B23D 79/005 . {for thermal deburring ([B23D 79/025](#) takes precedence)}
- B23D 79/02 . Machines or devices for scraping (turning-machines for bevelling, chamfering, or deburring the ends of bars or tubes [B23B 5/16](#))
- B23D 79/021 . . {for removing welding, brazing or soldering burrs, e.g. flash, on pipes or rods}
- B23D 79/023 . . . {internally}
- B23D 79/025 {including other than cutting means, e.g. hot gas}
- B23D 79/026 . . {for removing welding flashes on rails}
- B23D 79/028 . . {for removing welding flashes on chain links}
- B23D 79/04 . . with rotating cutting-tool, e.g. for smoothing linings of bearings
- B23D 79/06 . . with reciprocating cutting-tool
- B23D 79/08 . . Hand scraping-implements
- B23D 79/10 . . Accessories for holding scraping tools or work to be scraped
- B23D 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](#))

B23D 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](#))

B23D 2277/00**Reaming tools**

- B23D 2277/02 . Cutting head and shank made from two different components which are releasably or non-releasably attached to each other
- B23D 2277/04 . Cutting angles
- B23D 2277/06 . Connections between component parts
- B23D 2277/061 . . Brazed connections
- B23D 2277/062 . . Clamping the cutting insert or cutting bit by means of plastic deformation
- B23D 2277/063 . . Clamping the cutting insert or cutting bit using an elastically deformable clamping member
- B23D 2277/064 . . using a specially shaped fixation hole in the cutting insert or cutting bit
- B23D 2277/065 . . Glued connections
- B23D 2277/066 . . using a hollow screw, e.g. for the transmission of coolant
- B23D 2277/067 . . using heating and cooling, i.e. heat shrinking
- B23D 2277/068 . . using a groove in the top face of the cutting insert or bit engaged by a clamp
- B23D 2277/08 . Adjustment mechanisms
- B23D 2277/081 . . for axial adjustment of the cutting edge, cutting insert or cutting bit
- B23D 2277/083 . . with means to prevent the user accessing the adjusting mechanism
- B23D 2277/085 . . comprising hydraulics
- B23D 2277/086 . . comprising gears
- B23D 2277/088 . . with an adjustment screw of special form
- B23D 2277/10 . comprising means for damping of vibration, i.e. for reduction of chatter
- B23D 2277/105 . . with cutting edges located at unequal angles around the periphery of the tool
- B23D 2277/12 . comprising balls
- B23D 2277/14 . Means for burnishing
- B23D 2277/16 . Use of centrifugal force to activate cutting means
- B23D 2277/20 . Number of cutting edges
- B23D 2277/201 . . One
- B23D 2277/202 . . Two
- B23D 2277/203 . . Four
- B23D 2277/204 . . Five
- B23D 2277/205 . . Six
- B23D 2277/206 . . Eight
- B23D 2277/207 . . Nine
- B23D 2277/208 . . Ten
- B23D 2277/24 . Materials of the tool or the intended workpiece, methods of applying these materials
- B23D 2277/2407 . . Applied by chemical vapour deposition [CVD] processes ([coating by chemical vapour deposition in general C23C 16/00](#))
- B23D 2277/2414 . . Applied by physical vapour deposition [PVD] processes ([coating by physical vapour deposition in general C23C 14/00](#))
- B23D 2277/2421 . . Aluminium
- B23D 2277/2428 . . Ceramics, e.g. aluminium oxide or silicone nitride

B23D 2277/2435	. . Cubic boron nitride [CBN]
B23D 2277/2442	. . Diamond
B23D 2277/245	. . . polycrystalline [PCD]
B23D 2277/2457	. . Elastomers, e.g. rubber
B23D 2277/2464	. . Hard metal, i.e. cemented carbide
B23D 2277/2471	. . Steel
B23D 2277/2478	. . . high speed steel
B23D 2277/2485	. . Titanium nitride
B23D 2277/2492	. . Titanium carbide
B23D 2277/26	. Means for breaking chips
B23D 2277/28	. Chip collectors
B23D 2277/30	. Chip guiding means
B23D 2277/32	. Details of the region preceding the axial cutting edge in the direction of feed
B23D 2277/34	. comprising cutting inserts made from different materials
B23D 2277/36	. with the diameter of the tool decreasing in the direction of the shank from the cutting tip
B23D 2277/38	. comprising eccentrics
B23D 2277/40	. configured to ream an external surface
B23D 2277/42	. comprising floating cutting heads
B23D 2277/44	. comprising chip grooves, i.e. flutes, of special form
B23D 2277/46	. Guiding pads
B23D 2277/48	. Guiding rollers
B23D 2277/50	. configured as a hand tool
B23D 2277/52	. Details of helices, e.g. helix angles or helices of special form
B23D 2277/54	. comprising cutting inserts inclined in the axial plane
B23D 2277/56	. comprising an indication scale
B23D 2277/58	. Keys, e.g. spanners or allen keys, for assembling or disassembling the reaming tool
B23D 2277/60	. comprising means for lubrication or cooling
B23D 2277/62	. Margins, i.e. the area on the circumference of the tool immediately behind the axial cutting edge
B23D 2277/64	. Markings, letters or numbers
B23D 2277/66	. Measurement of the tool or bore
B23D 2277/68	. Pilots
B23D 2277/70	. Polygonal sections, e.g. for torque transmission between parts able to be uncoupled
B23D 2277/72	. comprising a body having a special profile, i.e. having an special cross section
B23D 2277/74	. comprising serrations
B23D 2277/76	. Shims
B23D 2277/78	. for use with holes associated with spark plugs or glow plugs
B23D 2277/80	. comprising a spring

- B23D 2277/82 . for producing a stepped bore
- B23D 2277/84 . with tangentially mounted cutting inserts
- B23D 2277/86 . comprising a thread