

B23 MACHINE TOOLS; METAL-WORKING NOT OTHERWISE PROVIDED FOR (punching, perforating, making articles by processing sheet metal, tubes, or profiles B21D; wire-working B21F; making pins, needles, or nails B21G; making chains B21L; grinding B24)

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)

This subclass covers machines for shearing sheet metal or other stock material except metal foils workable in a manner analogous to paper, which is covered by class B26. [2]

PLANING; SLOTTING		Accessories.....	39/00
Working method of the machine	1/00, 3/00, 5/00	Machines or devices for reaming bored holes	75/00
Machines characterised by constructional features of a part	7/00	SAWING	
Hand-operated devices; portable apparatus	9/00	Working method of machines or apparatus	
Devices for attachment to any machine tool.....	11/00	using saw discs	45/00, 47/00
Tools, tool holders	13/00	using straight saw blades.....	49/00, 51/00
SHEARING		using endless saw blades	53/00, 55/00
Working method of machines or apparatus	15/00, 17/00, 19/00, 27/00, 31/00	other working methods.....	57/00
Hand-held devices	21/06, 27/02, 29/00	Machines or devices characterised by constructional features of a part.....	47/00, 51/00, 55/00
Tools, holders, chucks	35/00	Tools and attachment thereof; dressing thereof; making thereof	51/00, 61/00; 63/00; 65/00
Accessories	33/00	Accessories.....	59/00
Machines for particular work	21/00, 23/00, 25/00	Control arrangements.....	36/00
Control arrangements	36/00	FILING; RASPING	
BROACHING; REAMING		Working method of machines or apparatus.....	67/00
Working method of machines or apparatus	37/00	Machines or devices characterised by constructional features of a part.....	69/00
Machines or devices characterised by constructional features of a part	41/00	Tools; making thereof	71/00; 73/00
Tools.....	43/00, 77/00	OTHER METHODS, MACHINES, OR DEVICES; COMBINATIONS	79/00; 81/00

Planing; Slotting

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

- 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

- 1/22 . . 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)

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- 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
 - 7/12 . of arrangements for impact damping or regenerating energy
 - 9/00 Hand-operated planing devices; Portable planing apparatus** (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) [4]
 - 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)
 - 13/02 . 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 each other**
 - 15/02 . having both upper and lower moving blades
 - 15/04 . having only one moving blade
 - 15/06 . Sheet shears
 - 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
 - 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
 - 19/08 . for special use, e.g. for cutting curves, for chamfering edges
 - 21/00 Machines or devices for shearing or cutting tubes** (as additional equipment for deep-drawing presses B21D 24/16; by sawing, see the relevant groups for sawing machines or sawing devices)
 - 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
 - 23/00 Machines or devices for shearing or cutting profiled stock** (hand-held devices B23D 29/00)
 - 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** (control arrangements specially adapted for machines for shearing stock while the latter is travelling otherwise than in the direction of the cut B23D 36/00; controlling slack in travelling flexible stock B21C 47/10) [2]
 - 25/02 . Flying shearing machines (B23D 25/12 takes precedence; flying shears for cutting in general B26D 1/56)
 - 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 (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) [4]
 - 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)
 - 29/02 . Hand-operated metal-shearing devices

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

- 31/02 . 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)
 - 33/02 . Arrangements for holding, guiding, or feeding work during the operation
 - 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

36/00 Control arrangements specially adapted for machines for shearing or similar cutting, or for sawing, stock while the latter is travelling otherwise than in the direction of the cut [2]

Broaching

37/00 Broaching machines or broaching devices

- 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

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

- 43/02 . for cutting by rectilinear movement (B23D 43/08 takes precedence)
- 43/04 . . having inserted cutting edges

- 43/06 . for cutting by rotational movement
- 43/08 . mounted on an endless chain or belt

Sawing (surgical saws A61B 17/14; sawing wood or similar material B27B)

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)

- 45/02 . with a circular saw blade or the stock mounted on a carriage
- 45/04 . with a circular saw blade or the stock carried by a pivoted lever
- 45/06 . with a circular saw blade arranged underneath a stationary work-table
- 45/08 . with a ring blade having inside saw teeth
- 45/10 . with a plurality of circular saw blades
- 45/12 . with a circular saw blade for cutting tubes
- 45/14 . for cutting otherwise than in a plane perpendicular to the axis of the stock, e.g. for making a mitred cut
- 45/16 . Hand-held sawing devices with circular saw blades
- 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) [2]
- 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) [4]

- 47/02 . of frames; of guiding arrangements for work-table or saw-carrier
- 47/04 . of devices for feeding, positioning, clamping, or rotating work
 - 47/06 . . for stock of indefinite length
- 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

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

- 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
 - 49/11 . . for special purposes, e.g. offset-blade hand saws [5]

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- 49/12 . . Hacksaws (B23D 49/11, B23D 49/16 take precedence; bows adjustable in length or height B23D 51/12) [5]
- 49/14 . . Pad saws (B23D 49/11, B23D 49/16 take precedence) [5]
- 49/16 . . actuated by electric or magnetic power or prime movers (B23D 49/11 takes precedence) [5]
- 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** [4]
 - 51/01 . characterised by the handle [5]
 - 51/02 . of beds; of guiding arrangements for work-tables or saw carriers; of frames [5]
 - 51/03 . . with extensible or collapsible frames [5]
 - 51/04 . of devices for feeding, positioning, clamping, or rotating work
 - 51/06 . . for stock of indefinite length
 - 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
 - 51/14 . . . Attachment of the tool
 - 51/16 . of drives or feed mechanisms for straight tools, e.g. saw blades, or bows
 - 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**
 - 53/02 . with stationarily-mounted wheels carrying the strap (B23D 53/06 takes precedence)
 - 53/04 . with the wheels carrying the strap mounted shiftably or swingingly, other than merely for adjustment
 - 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)
 - 55/02 . of frames; of tables
 - 55/04 . of devices for feeding or clamping work
 - 55/06 . of drives for strap saw blades; of wheel mountings
 - 55/08 . of devices for guiding or 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 groups B23D 45/00 B23D 55/00**
 - 57/02 . with chain saws

- 59/00 Accessories specially designed for sawing machines or sawing devices** (lubricating or cooling machine tools in general B23Q 11/12)
 - 59/02 . Devices for lubricating or cooling circular saw blades
 - 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**
 - 61/02 . Circular saw blades
 - 61/04 . . with inserted saw teeth
 - 61/06 . . . in exchangeable arrangement
 - 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
 - 61/14 . . with inserted saw teeth
 - 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
- 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**
 - 63/02 . Setting saw teeth by means of hand-operated devices
 - 63/04 . Setting saw teeth of circular, straight, or strap saw blades by means of power-operated devices
 - 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
 - 63/12 . . by grinding
 - 63/14 . . . Sharpening circular saw blades
 - 63/16 . . of chain saws (of mortise chain cutters B24B 3/14)
 - 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
- 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; details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00); **Accessories for filing or rasping** (attached to the tool B23D 71/10) [4]
- 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)
- 71/02 . for filing or rasping machines or devices
- 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)
- 77/00 Reaming tools**
- 77/02 . Reamers with inserted cutting edges
- 77/04 . . with cutting edges adjustable to different diameters along the whole cutting length
- 77/06 . Reamers 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
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- 79/00 Methods, machines or devices not covered elsewhere, for working metal by removal of material** (by combined operations B23D 81/00; working of metal by the action of a high concentration of electric current B23H; cutting by electron-beam B23K 15/00, by laser beam B23K 26/00; other working of metal B23P; tool holders for machine tools B23Q 3/00; handles for hand implements B25G)
- 79/02 . Machines or devices for scraping (turning machines for bevelling, chamfering, or deburring the ends of bars or tubes B23B 5/16; scrubbing or peeling ingots by milling B23C 3/14)
- 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 by making use of cutting bits arranged around the workpiece, otherwise than by turning (by turning B23B 5/12) [2]
- 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, B23P 23/00)