

## SECTION B — PERFORMING OPERATIONS; TRANSPORTING

### B23 MACHINE TOOLS; METAL-WORKING NOT OTHERWISE PROVIDED FOR

**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)

#### Note(s)

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.

#### Subclass index

##### PLANING; SLOTTING

Working method of the machine.....	1/00, 3/00, 5/00
Machines characterised by constructional features of a part.....	7/00
Hand-operated devices; portable apparatus.....	9/00
Devices for attachment to any machine tool.....	11/00
Tools, tool holders.....	13/00

##### SHEARING

Working method of machines or apparatus.....	15/00, 17/00, 19/00, 27/00, 31/00
Hand-held devices.....	21/06, 27/02, 29/00
Tools, holders, chucks.....	35/00
Accessories.....	33/00
Machines for particular work.....	21/00, 23/00, 25/00
Control arrangements.....	36/00

##### BROACHING; REAMING

Working method of machines or apparatus.....	37/00
Machines or devices characterised by constructional features of a part.....	41/00
Tools.....	43/00, 77/00
Accessories.....	39/00
Machines or devices for reaming bored holes.....	75/00

##### SAWING

Working method of machines or apparatus	
using saw discs.....	45/00, 47/00
using straight saw blades.....	49/00, 51/00
using endless saw blades.....	53/00, 55/00
other working methods.....	57/00
Machines or devices characterised by constructional features of a part.....	47/00, 51/00, 55/00
Tools and attachment thereof; dressing thereof; making thereof.....	51/00, 61/00, 63/00, 65/00
Accessories.....	59/00
Control arrangements.....	36/00

##### FILING; RASPING

Working method of machines or apparatus.....	67/00
Machines or devices characterised by constructional features of a part.....	69/00
Tools; making thereof.....	71/00, 73/00

##### 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

## B23D

- 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)
- 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	37/18	• Broaching machines with working tools mounted on an endless chain or belt
25/12	• Shearing machines with blades on coaxing rotating drums	37/20	• Broaching machines with arrangements for working in opposite directions
25/14	• without regard to the exact dimensions of the resulting material, e.g. for cutting-up scrap	37/22	• for special purposes (B23D 37/14 takes precedence)
<b>27/00</b>	<b>Machines or devices for cutting by a nibbling action</b>	<b>39/00</b>	<b>Accessories for broaching machines or broaching devices</b>
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]	<b>41/00</b>	<b>Broaching machines or broaching devices characterised only by constructional features of particular parts</b> (constructional features of these parts <i>per se</i> B23Q)
27/04	• • actuated by electric power	41/02	• of frames; of work supports
27/06	• • actuated by fluid or gas pressure	41/04	• of tool-carrying arrangements
<b>29/00</b>	<b>Hand-held metal-shearing or metal-cutting devices</b> (with nibbling action B23D 27/02; hand-operated devices for metal-cutting otherwise than by shearing B26B)	41/06	• of devices for feeding, clamping, or ejecting workpieces
29/02	• Hand-operated metal-shearing devices	41/08	• of drives; of control devices
<b>31/00</b>	<b>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</b>	<b>43/00</b>	<b>Broaching tools</b> (for cutting gear teeth B23F 21/26)
31/02	• for performing different cutting operations on travelling stock, e.g. slitting and severing simultaneously	43/02	• for cutting by rectilinear movement (B23D 43/08 takes precedence)
31/04	• for trimming stock combined with devices for shredding scrap	43/04	• • having inserted cutting edges
<b>33/00</b>	<b>Accessories for shearing machines or shearing devices</b> (feeding stock to machines or removing stock B21D 43/00)	43/06	• for cutting by rotational movement
33/02	• Arrangements for holding, guiding, or feeding work during the operation	43/08	• mounted on an endless chain or belt
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)	<b>Sawing</b>	
33/08	• Press-pads; Counter-bases; Hold-down devices	<b>45/00</b>	<b>Sawing machines or sawing devices with circular saw blades or with friction saw discs</b> (shearing machines with rotary discs B23D 19/00-B23D 25/00)
33/10	• Stops for positioning work	45/02	• with a circular saw blade or the stock mounted on a carriage
33/12	• Equipment for indicating where to cut	45/04	• with a circular saw blade or the stock carried by a pivoted lever
<b>35/00</b>	<b>Tools for shearing machines or shearing devices; Holders or chucks for shearing tools</b>	45/06	• with a circular saw blade arranged underneath a stationary work-table
		45/08	• with a ring blade having inside saw teeth
<b>36/00</b>	<b>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</b> [2]	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)
<b>Broaching</b>		<b>47/00</b>	<b>Sawing machines or sawing devices working with circular saw blades, characterised only by constructional features of particular parts</b> (constructional features of these parts <i>per se</i> B23Q; details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) [4]
<b>37/00</b>	<b>Broaching machines or broaching devices</b>	47/02	• of frames; of guiding arrangements for work-table or saw-carrier
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		

## B23D

- 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]
- 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****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

**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)