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

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 • Pivotally-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

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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

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]**
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

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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)